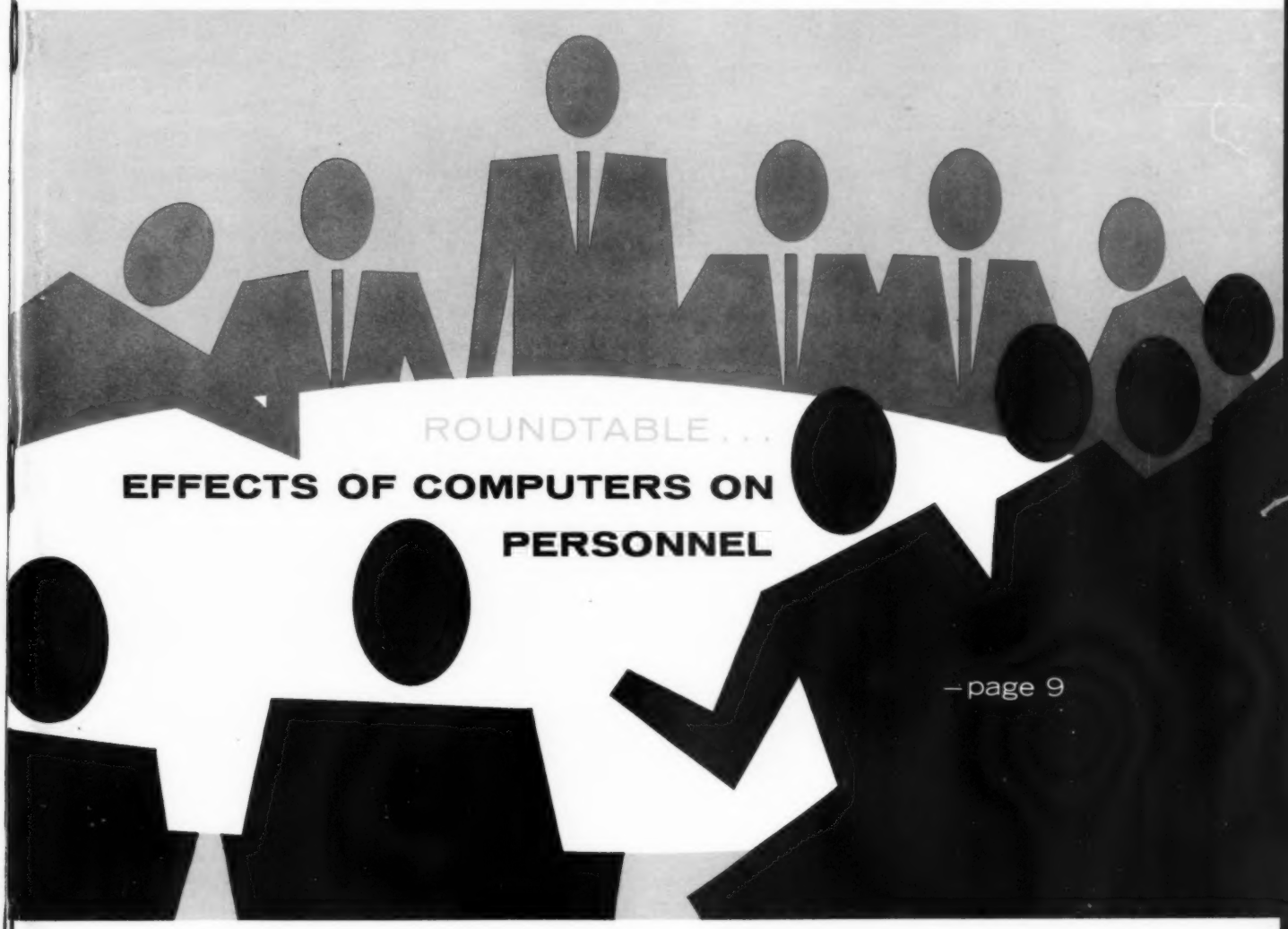
NOVEMBER 1961

DATA PROCESSING®

THE MAGAZINE OF AUTOMATIC OFFICE METHODS AND MANAGEMENT



ROUNDTABLE . . .

EFFECTS OF COMPUTERS ON PERSONNEL

– page 9

- Automatic Translation – page 23
- Extending Man's Intellect – page 26
- English Computers – page 39

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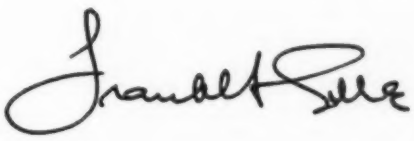
OBSERVATIONS . . .
from the publisher

I AM PARTICULARLY IMPRESSED with two positive facts referred to in our recent Roundtable discussion (covered in detail elsewhere in this issue).

First is the fact that the phenomena which have occurred thus far as a result of electronic data processing are certainly only the precursors of many unforeseeable phenomena yet to come. It must be admitted (and recognized as unfortunate) that the occurrence of these new phenomena are not measurable or foreseeable.

So revolutionary are the changes that are likely to occur that one could only hope to suggest the more obvious ones. It is the consideration of the phenomena which can hardly yet be dreamed of that will likely have the greatest impact on humanity.

The second fact which impressed me is the tremendous opportunities available to all those in this field diligent enough to apply a conscientious effort. So that these opportunities may be realized by the greatest number of people it would seem necessary that leaders in every phase of society be made aware of the changing phenomena. The people of the world must be *motivated* to an increasingly higher level of education; this motivation must come from religious and social leaders, government leaders, industrial leaders, and indeed the father to his family, if we are to take full advantage of these opportunities.



CONTENTS

NOVEMBER, 1961

Cover Feature

▶ EFFECTS OF COMPUTERS ON PERSONNEL by Edith Harwith Goodman 9

This first report of the Roundtable covers the scope, psychological effects and job opportunities.

Features

▶ AUTOMATIC TRANSLATION by Dr. L. A. Steiner 23

A report of the first International Conference on Machine Translation and Applied Language Analysis convened in England — who was represented — what was covered.

▶ EXTENDING MAN'S INTELLECT from John Diebold & Associates, Inc. 26

Some highlights on the theme of the 1961 WJCC.

▶ NATIONAL ELECTRONICS CONFERENCE by Edith Harwith Goodman 36

▶ COMPUTERS IN GREAT BRITAIN by John H. DeJong 39

STAFFING FOR CONVERSION by George A. Ford 44

▶ PICK A PATH WITH PORT-A-PUNCH by Joseph F. Reilly 48

By using special coded cards and an on-the-spot punching device, the information gathering of an origin and destination traffic study was greatly expedited.

▶ WHAT DOES DATA PROCESSING NEED MOST TODAY? by Max Joseph Havlick 53

The author questions the negative attitudes many data processing people have about the worth of their function.

▶ ACM MEETS NATIONALLY by Jackson W. Granholm 54

The JWG view of what went on at the 1961 National Conference of the Association for Computing Machinery.

Monthly Features

▶ *Ray Marien on FORMS*
NEW — IN THE SYSTEMS FORMS FIELD 30

▶ *Joseph R. DeParis on EQUIPMENT*
FEASIBILITY STUDIES 32

Departments

▶ BOOK SHELF 66
▶ COMMENTS FROM READERS 5
▶ COMING EVENTS 18
▶ DATA . . . YOURS FOR THE ASKING 65
▶ EDITORIAL 68
▶ NEW EQUIPMENT 58
▶ NEWS SUMMARY 19
▶ NOTABLE QUOTES 60
▶ OBSERVATIONS 3
▶ OFF LINE 64
▶ PEOPLE AND PLACES 56
▶ PRODUCTS AND SERVICES 61

AUTHORS

MAX JOSEPH HAVLICK *(What Does Data Processing Need Most Today?)* is president of Executive Computer Utilization, an organization of professional data processing consultants. It is currently offering its third series of classes in computer programming.

■

JOSEPH F. REILLY *(Pick a Path with Port-A-Punch)*, director of the Bureau of Office Services of New York State, is a graduate of LaSalle Institute, Troy, N. Y. and studied at St. Joseph College, Kingston, N. J. and Siena College, Loudonville, N. Y.

Mr. Reilly entered New York state service in 1929 as a clerk with the Department of Public Works. After seven years with this department he served five years each with the Departments of Labor and Education, for whom he supervised punched card installations. In 1946 he joined the Division of Licenses of the Department of State, where he was in charge of the division's punched card installation, methods and procedures and personnel time distribution. In 1957 he returned to the Department of Public Works as director of the Bureau of Office Services. As efficiency expert, Mr. Reilly is responsible for the department's data processing installation, mail and supply, reproduction, art, photography and record keeping.

■

L. A. STEINER *(Automatic Translation)* is an automation consultant in London, England. He covered the first International Conference on Machine Translation and Applied Language Analysis, organized by the National Physical Laboratory, which was held at Teddington, England, September 4-8, 1961. Dr. Steiner's article appears on page 23.

■ ■ ■

COMMENTS

Business Advisory Committee

Chicago, Ill.

Dear Sirs:

I very much enjoyed the editorial in the August issue of *Data Processing*. Such recognition of the value of science fairs and the needs of the students is indeed rare among national publications.

The Business Advisory Committee has been working for the past three years to obtain greater support by industry in Illinois for the same efforts. The Committee was originally sponsored by the Education Committee of the Illinois State Chamber of Commerce. It functions in an advisory and assisting relationship to the Illinois Junior Academy of Science.

A meeting of the Committee is scheduled for September 20 in Decatur, and I have taken the liberty of duplicating your editorial to distribute to the other members of the Committee. I anticipate that they will highly appreciate the help your editorial can add to their effort.

I also anticipate that the Committee will wish to distribute your editorial to industry leaders in our state to call attention to ways in which they can help this effort. May we, therefore, have your permission to do so?

Charles H. Koenig, Principal
A. T. Kearney & Company

We're pleased to give our permission. Editor.

After the roundtable

Washington, D. C.

Dear Sirs:

. . . . I would also like to state that, in my opinion, *Data Processing* magazine is a very excellent publication. It is gratifying to me that you folks are taking a most responsible position in attempting to objectively assess and help find solutions to the problems arising out of the phenomena generated by accelerating technological change.

A. A. Flakoll
Special Assistant to the
Deputy Assistant Secretary of Labor

Demonstrating storage and retrieval techniques

Washington, D. C.

Dear Sirs:

The Information Systems Operation of the General Electric Company plans to demonstrate some storage and retrieval techniques. We wish to use information published by your organization as a part of several articles in a file that will be retrieved and printed out for demonstration only.

The articles have been carefully selected with respect to subject coverage, style, type of available abstract and similar factors . . .

Exhibit I lists the abstracts and/or the articles which have been selected from *Data Processing* ["Optical Character Recognition," "Optical Scanning Equipment," "Data Processing and Higher Management," "Measuring Programmers Effectiveness," "Computer Tapes and Their Care," "RASTAD System, Data-Phone"] . . .

Earl B. Stroup, Manager
Information Processing Techniques
General Electric Company

Permission given. Editor.

Management games

Milford, N. J.

Dear Sirs:

We are interested in getting reprints of the following articles which appeared in *Data Processing*, August 1961:

"Why Management Games" by F. M. Webster, Jr.; "We Lost $25,000" by Van B. Thompson; and Book Shelf Item, "Management Games" by Kibbee, Craft, and Nanus.

We would like to enclose a copy of these in our invitations to management teams to compete in a running of a game at our AIIE Northeast Regional Conference.

F. C. Eichel
Program Chairman
Lehigh Valley Chapter
American Institute of Industrial Engineers, Inc.

Permission given. Editor.

Shadrach to the Marines

Washington, D. C.

Dear Sirs:

I have read with interest the article "From Shadrach to Univac" in the September issue of *Data Processing* magazine and both your magazine and the author, Mr. Robert J. Fitzpatrick, are worthy of congratulations on the excellent presentation of the article.

The article has fine historical value in the data processing field and the Marine Corps is interested in utilizing the article within the Marine Corps data processing education program . . .

H. J. Smart, Colonel
Data Processing Officer
Headquarters, U. S. Marine Corps

Reprint permission given. Editor.

DeParis and random access

Philadelphia, Pa.

Dear Sirs:

I find your monthly feature, "DeParis on Equipment," very interesting and certainly agree with Mr. DeParis on his belief that random access processing will be the system of the future.

The IBM 1301 Disk Storage Unit is a fine step in this direction, however I would like to point out that Telex Inc. and Bryant Computer Products have had random access disk storage files available for over one year. These units also use the cylindrical concept. Capacities range from 30,000,000 to 700,000,000 bits; access times range from a minimum of 30 milliseconds to a maximum of 250 milliseconds, with an average of 150 milliseconds. These units can be connected to a computer by using a core buffer as an interface.

Your contributions to the data processing field have been outstanding — reading your magazine is a must. I want to wish you long and continued success.

Walter T. Jones, Jr.
Data Processing Dept. Manager
Queen Knitting Mills, Inc.

At any remote location, a 1001 Data Transmission Unit reads punched cards and transmits the information over regular telephone lines.

IBM 1001 DATA TRANSMISSION SYSTEM ... new low cost way to send punched card data ... by telephone

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The rest is automatic. The equipment reads the card, transmits the information over your regular telephone lines, and reproduces an identical punched card, ready for processing. You can connect a number of departments, plants, offices or customers with this 1001 Data Transmission System.

This is another example of IBM TELE-PROCESSING* Systems which help business act faster by speeding up collection of the facts on which action is based. TELE-PROCESSING Systems are available for coordination of anything from a warehouse to an entire company.

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At the data processing center, an IBM Card Punch receives data by phone and automatically punches it into a card, ready for processing.

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ROUNDTABLE PARTICIPANTS

ALAN D. MEACHAM, Editor, DATA PROCESSING, Roundtable Chairman

ALBERT A. BLUM is professor in the Social Science Department and associated with the Labor and Industrial Relations Center at Michigan State University, East Lansing. He has taught industrial relations at New York University, the New York State School of Industrial and Labor Relations at Cornell University, and at The American University.

Dr. Blum is well known for his writing in the field of industrial relations. While a member of the staff of the National Industrial Conference Board, he was co-author of two studies, *Unionization Among American Engineers* and *Labor Relations in the Atomic Energy Field.*

Dr. Blum, a graduate of the City College of New York, received his Ph.D. degree from Columbia University.

JOHN DIEBOLD is president and founder of The Diebold Group, Inc., a multi-national corporation providing management services to private and public organizations with offices in 13 cities on three continents. At 35, he has an international reputation as a leader in the fields of management and automation.

Mr. Diebold is a member of Secretary Goldberg's advisory committee on Automation and Manpower; he is a U. S. director of the International Cybernetics Association; a member of the Visiting Committee of Clarkson College; member of the Institute of Directors, London; and of numerous professional societies in the United States and abroad. His views are sought by U. S. government groups, professional societies, and management organizations throughout this country and Europe.

H. B. DOUGLAS is Director of Organization for the Office Employes International Union, New York. From 1937 to 1953, when he took his present position with OEIU, Mr. Douglas was on the American Federation of Labor National Staff as an organizer.

ADRIAN A. FLAKOLL, management selection and development administrator for the Lockheed Company, is on a 23-week working assignment in the Office of the Secretary of Labor to observe from within decision and policy making operations of government. He is currently Special Assistant to the Deputy Secretary of Labor, working on automation and related manpower problems.

Mr. Flakoll is one of nine executives selected from leading American companies under a grant as Public Affairs Fellows from The Brookings Institution. The fellowships were awarded "to individuals possessing exceptional capacities for leadership" in a pilot project to build understanding between the Federal government and major segments of our society.

EINAR HARDIN is associate professor of economics at Michigan State University and serves currently as associate director of research and planning in its Labor and Industrial Relations Center. A graduate of the College of Economics and Business, Goteborg, Sweden, he received his Ph.D. from the University of Minnesota. He has taught economics at the College of Economics and Business, Minnesota, and Michigan State. He is conducting research on the economic and social effects of office automation and has published articles on this topic in the *Industrial and Labor Relations Review*, the *Monthly Labor Review*, the *Journal of Applied Psychology*, and the *Michigan Economic Record.*

ARVID W. JACOBSON is founder and head of the Detroit Research Institute and president of the Detroit Research Company. He is one of the nation's leading authorities on electronic computers and data processing systems.

Dr. Jacobson, a mathematician, was the first director of the Wayne University Computation Laboratory, and served as professor of mathematics at the university from 1945 to 1961, when he resigned to give full time to the Institute.

Dr. Jacobson holds degrees from Ferris Institute and the University of Michigan. He is a member of the American Mathematical Society, Association for Computing Machinery (in which he is chairman of the Social Responsibility of Computer Users committee), Industrial Mathematics Society, Association for the Advancement of Science, Institute of Management Sciences, and the American Association of University Professors.

PAUL M. PAIR owns and operates the Pair Secretarial School, Automation Institute, and MacDonald Management and Engineering School. He has an M.A. degree in education from the University of Washington. After fifteen years as superintendent of schools in Prosser and Kirkland, Washington, he was brought to Chicago by the Gregg College in 1940 to serve as director. In 1953 he opened his first school in Chicago.

Mr. Pair is a member of the board of directors of the Office Management Association of Chicago and chairman of its Education Committee, a member of the Private Business Schools Committee of the National Office Management Association, and secretary of Private Business Schools State Board for Illinois.

EVERETT E. ROLL is general accountant with the Detroit Edison Company. He has a B.S. degree from the University of Illinois and C.P.A. Illinois. A member of the National Association of Accountants, he was president of the Detroit chapter in 1959-1960. He belongs to the Edison Electric Institute, and is a member of the Accounting Division Executive Committee and the Committee on Accounting Principles.

Mr. Roll has published "Accounting for Tax Amortization of Defense Facilities," in *Public Utilities Fortnightly*, December 20, 1951; "Supervision in the Accounting Department," National Association of Cost Accountants *Bulletin*, June 1957; and "A Yardstick for Managerial Efficiency Is an Important Tool," *Electric Light and Power*, August 25, 1955.

JOHN C. THOMSON is vice president - personnel at Hardware Mutuals and Sentry Life Insurance Company, Stevens Point, Wisconsin. Prior to 1952, when he assumed his present position, Mr. Thomson served as claims examiner, budget manager, home office general claims manager, and district manager - Cincinnati, for the company, for whom he began working in 1935.

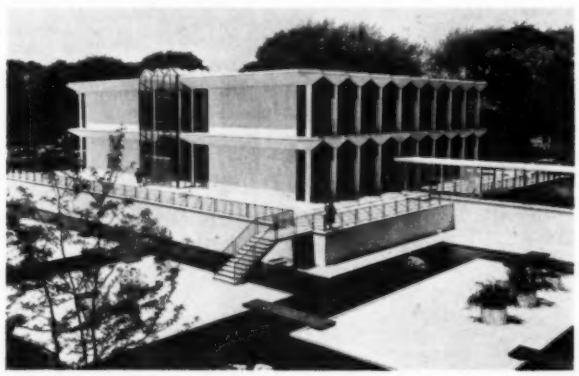
He attended Kansas City Junior College, then studied business administration at the University of Chicago, law at DePaul University, and an advanced management program at Harvard University.

COVER FEATURE

Effects of Computers on Personnel

By Edith Harwith Goodman, Managing Editor

McGregor Center, Wayne State University, Detroit, Michigan, scene of September, 1961 Roundtable sponsored by Data Processing Magazine.



TRYING TO DEFINE the impact of electronic data processing on the white collar office worker is like putting a finger firmly on a globule of mercury. Result : many small elusive globules.

The nine participants in our September roundtable discussion covered four areas of the question: the scope, job opportunities, education and training, and responsibilities in each area.

Some of the obstacles to definition are: the very short-perspective history, because computer use for business problems covers less than a decade; a paucity of studies in the field; the obsolescence of material gathered for study due to fast moving changes in hardware-software; the rapid expansion of installations; and new indus-

tries, which may not primarily use young women workers in the office, extending computer systems use.

Highlights from the actual transcript of the discussion explain some of the difficulties.

Unemployment vs. displacement

Most available studies show little actual unemployment ensuing from the installations covered. However, this rosy picture is not an exact one as the studies conducted have been in more responsible companies which planned to retain personnel, letting attrition solve the problem of overstaffing (attrition, in this context, has come to mean young women workers who marry, get pregnant, and leave); most studies cover insurance and utilities, both industries using large numbers of young women clericals. These installations were in rapidly growing businesses whose expanding volume of work absorbed those displaced from former jobs. These studies also pertain to relatively small, slow computers (many card IBM 650s). What results will be evident with the rapid change to faster, more sophisticated hardware-software and extended use in other types of industries cannot be clearly foreseen.

Displacement was a main area of concern, as Mr. Roll put it:

> Many times displacement is used as a synonym for unemployment. If an employee is going to be placed on a different job he is going to have to learn the new job. He will have a new boss. He may have to change work groups. He may have to move to a new location. These are displacement problems. Often they are more serious than unemployment, particularly if you take care to minimize the latter. Often there are economic, social and psychological problems in displacement.

"The internal problem is: what will happen to the workers within your company?" said Dr. Blum. "The later problem is also quite important: where will the increasing labor force find jobs?"

The situation in Federal government, largest computer user in the world, is quoted from a statement received from the Honorable John Lesinski, Congressman from Michigan's 16th district, who could not attend because the House of Representatives was winding up its affairs in Washington.

> As regards Federal government employment, as yet there has been no wide-scale displacement of workers as a result of electronic data processing.
>
> This picture may change later in the 60s, however, when document sensing devices replace card punching operations.
>
> Card punch employment in the Federal agencies is expected to decrease 12 percent in 1962, but employment in computer installations is expected to increase by the same amount.
>
> The Internal Revenue Service is now engaged in converting all its income tax work to computers. Nonetheless, the Director of IRS recently reported that total IRS employment will increase from 51,000 in 1960 to an estimated 98,000 in 1969. Over the same period, they estimate that revenues will increase from $2.5 billion to almost $5 billion. Computers will bring better results in tax collections, but more employees will be required.
>
> Some displacement does occur, of course, when computers are used—the 1960 Census employed 5,000 fewer temporary clerks than in 1950 when the population was 30 million persons less. No permanent jobs were affected, however.

. . . economic, social, and psychological problems in displacement.

EVERETT E. ROLL

What will happen when this is multiplied 50,000 times?

JOHN C. THOMSON

From private industry, his own company experience was cited by Mr. Thomson:

> In 1956, our roster contained 3,776 people. Our volume was 80 million, and our production unit was 21,000 per employee.
>
> The installation of an IBM 7070 and Data-Phone system was worked in over a four year period. On July 31, 1961, our population was 3,772 — we had dropped four people. Our premium volume is up to 110 million. We have about a 35 percent increase with almost the same number of employees.
>
> The technical managerial group has increased by about 50, the sales force has increased by 100, and the clerical force has decreased by 150.
>
> We have not dismissed or laid off any person; that promise was made on January 1, 1956 and lived up to. We have had five years to do this; we hire our clerical people in the 18-21 bracket, and girls tend to get married and become pregnant. That solves itself through attrition.
>
> But if we had to handle our '61 premium volume with a clerical staff proportional to that of 1955, we would have 836 more clerical employees. They are not there.

MR. ROLL: Those are the people Dr. Blum is worrying about.

MR. THOMSON: This is not the concern of our corporation. We can solve the replacement problems and the upgrading problems, and the permanence and security of our people. I will admit that ours is a small isolated situation, but I think it is fairly typical. It has been a growth industry, so that it has been possible for us to absorb as we go along. But I cannot envisage what is going to happen in terms of this multiplied by 10,000 or 20,000 or 50,000 institutions, in terms of the total labor market.

Mr. Diebold said innovation will solve it.

Mr. Diebold's statement boxed *(on next page)*

The new industry is going to be a large number of things, but most of the use of this technology will be to do things that we don't do today.

JOHN DIEBOLD

MR. DIEBOLD:

There are a large number of phenomena going on. Most of these lead you to do a large number of things that you didn't do before, and this is going to increase.

Fundamentally, electronic data processing is one family, one activity that has been spawned by the technology of information handling. There are other families of machines that are going to be spawned by technology.

Similarly, equipment of this kind for traffic control: for air traffic, for vehicular traffic on the ground; for demands of a much more complex society than we had in the past. That didn't exist before either. You are going to need a large mass of machines, very large groups of systems for long range weather prediction and long range weather control. This never existed before.

Translation of languages automatically and continuously, the scanning of articles, the automatic translation, the abstracting of the translation, the storage, the retrieval, the search of it; these are the functions that are performed very crudely and only by a small segment of society at the present time. But every place in human society where the handling of information or communication takes place is going to be affected by the innovations of this revolution in information handling.

That is the new industry. New industry is going to be a large number of things, but most of the use of this technology will be to do things that we don't do today. It will be extending the range of human capacity in a very large number of ways.

For the first time, we have a technological revolution taking place in the handling of information. Information is the whole basis of society; transmission and communication and information determines the whole structure of the society. We are suddenly experimenting with this, and fundamentally doing research in this. Changing it in very radical ways is going to produce a tremendous social change. There are compelling political as well as economic reasons why we must pursue that. We must pursue that technology more aggressively than we do now. There are overriding political reasons for doing this, quite apart from the general economic reasons, but we must pursue this. It means that every element, related to change, is going to be that much more essential, and it means that each of the problems is going to be that much greater. The problems associated with this and the problem of replacement of individuals doing a particular clerical function in the office is a tiny part of that problem. There is a much wider one.

DR. BLUM:

The people that have been installing data processing equipment in their offices have been relatively big companies, wealthy companies, and they have been able to secure the advice of competent people. But what happens when the data processing equipment gets cheaper? It goes into smaller establishments; they are not going to be worried about personnel practices; they are not going to have the money to be able to afford the retention of people, and will adjust as other companies have done in the past. They are just going to lay off their people.

MR. DIEBOLD:

For the first time, we will begin to have medical diagnoses which will lead to correct diagnoses. At the present time, half of the medical diagnoses are incorrect because we have a faulty storage of data.

DR. BLUM:

You may be right, but unless plans are made to cushion this impact of technological change, I don't know that this has to come. There is nothing that has happened in the past that has to repeat itself. No historian would claim this except those historians that are not respected.

MR. DIEBOLD:

Let me set this straight. I am not in any way belittling the problem of social adjustment. I think the problem is a much greater one than you think it is. I think that it is much greater than the problem of unemployment. I think that is trivial in comparison to the problems of social adjustment. There are fundamental education problems, and this is the basic problem. You look at your unemployment statistics today. The people who are unemployed are the non-skilled workers, an increasing percentage of non-skilled workers. You need an adjustment in education.

A twofold problem, internal and external.

ALBERT A. BLUM

Psychological reactions

When Mr. Thomson said that the social value of eliminating dull, monotonous work should not be overlooked he was challenged in that not all jobs were upgraded as a result of a computer installation.

DR. HARDIN: One of the paradoxes one runs into is that the work may improve for certain employees, but it deteriorates for others.

We have found in studies done at the Labor and Industrial Center that the employees who were in the computer area (that is, the area where the 650 is operated, the tabulating and key punch, and systems control) were happier about the work. It was much more interesting than before. But the people in the departments that lost work to the computer felt their work was more monotonous than before.

MR. FLAKOLL: I think this gets back to what Mr. Roll was saying insofar as sociological and psychological impact within the structure itself, which is a whole area needing more study.

Obviously, when you have shifts in terms of power and decision making within that structure it is going to be difficult for people to digest, along with all the other problems.

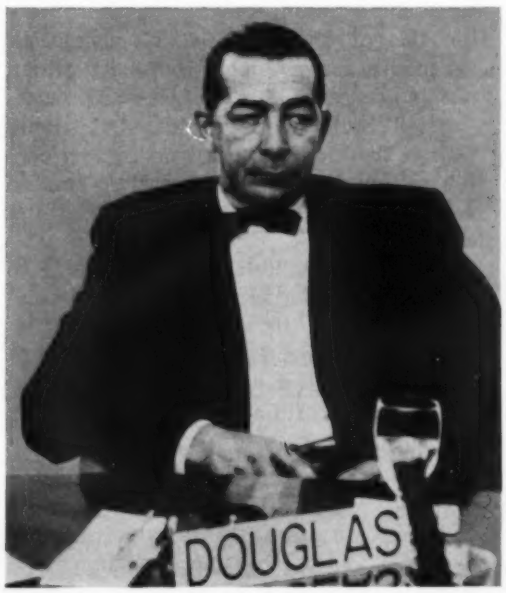
I am concerned with the people involved.

H. B. DOUGLAS

One of the problems of changing routines and jobs was found by Mr. Douglas and Mr. Roll to be age, but chronological age was eliminated as the culprit in favor of age-on-the-job. Particularly where jobs were specialized in one thing, people learned the job and after many years did not want to learn anything different.

MR. ROLL: They are a big problem to us right now because we haven't cut anybody's pay, even though they are in a lower grade classification. I don't think we are going to be able to find jobs at the level that they had formerly which they can do.

MR. DOUGLAS: My experience has been exactly the same with older people that are replaced. We have a great deal of difficulty in getting them to accept the change, and to learn a new job. It almost seems that they have a mental block and refuse to accept the fact that they no longer have their little kingdom that they built up over 25 or 35 years. And now that they have been moved out they are crushed.



Dr. Hardin reported that the MSU studies had found no relation between age and readiness to change. It was the status of the person involved, his economic, social, and educational status and background that determined his welcome or resistance to change. Those of higher status welcomed change as a challenge, those with lower status resisted change (see box for details).

Opinion in the companies we have studied is that the overwhelming majority of people welcome change.

EINAR HARDIN

DR. HARDIN:

That which has taken most of our efforts, time, and money is an analysis of psychological problems associated with technological change. One of the concepts that has been studied in the Center is the so-called readiness for change.

Resistance to change is a negative aspect of the behavior, and it was felt there were some people who not only did not resist change, but actively welcomed change, and were promoted. We were interested in finding out about the characteristics of these people. We made an attitude scale of nine items with which people are asked to agree or disagree.

"If I could do as I pleased, I would change the kind of work I do." Many people get used to a job that they can do well, then want to change to something else.

We have then related this variable to a variety of other factors, including social class status in the organization, and degree of education. Tentatively we find it to be a very interesting factor which essentially seems to reflect a person's capacity for adjustment.

For instance, those of higher education are more ready for change than those with a lower education; those who think of themselves as being more capable than others in the organization are readier for change. Those who are supervisors are readier for change than those who are non-supervisors, and so on. We have also done some work, although we don't know all we want to know about this variable, on the question of how one can affect people's readiness for change.

This is something which depends on the person's past experience. One of the studies, based on the huge volume of material that we have from questionnaire data, indicates that the information program of a company has very little to do with how people's readiness for change was altered under the impact of technological change. But what they thought about the truthfulness of a company was very important. Not whether they know what the company had said, but whether they believed the company or not.

In studying how people perceived changes we found very decidedly that people attributed change to the computer much more in the computer area than the other areas. But at the same time, when we asked them, "How much change has there been in this aspect of your job in the past six months or past year," we found very little difference. Which sug-

gests that the changes that take place in computerized departments, and other departments, were not very large. They developed pretty much the same way.

Now, there is an alternative interpretation, which is: that what people perceive in their jobs has nothing to do with whatever actually happens in their jobs, and we have some bit of evidence indicating that this may not be altogether wrong. From a psychological standpoint, if people do not notice any changes in the skills or in variety or in pay and so forth, then how can their psychological experience be different?

It is this sort of problem that we have, when we try to use the employees' attitude data. We also have some general data about how people feel about technological change, and do they wish there were more or that there would be less of it, and so forth. A striking majority of opinion in both the two relatively small companies that we have studied is that people, the overwhelming majority, welcome change or a variety. They would not welcome change which consisted in their being laid off without dismissal pay or anything like that. They did not perceive change as being threatening to them, but as something relieving their boredom, and perhaps making things more interesting.

MR. DIEBOLD:
How many individuals were involved?

DR. HARDIN:
In one company about 280, and in the other company, about the same number. These are insurance companies, medium-sized. We did not cover maintenance personnel. It was white collar personnel, up to and including the level right below the president.

MR. DIEBOLD:
These were depth interviews?

DR. HARDIN:
These were not depth interviews; they were written questionnaires. They were of the multiple choice variety on which the response could be checked.

MR. DIEBOLD:
When was this done?

DR. HARDIN:
The first questionnaire study was made in November of 1957 before the computer came in. The second, in May, 1958, after the computer was in, and in the midst of the automobile recession in Michigan.

MR. DIEBOLD:
Were these card 650's?

DR. HARDIN:
They were card 650's of the old conventional sort. There was no tape, no additional sophistication, so that we were also aware that the attitudes and the relationships that we found might be altogether different in a large station. We simply do not know this.

Readiness for change, the variables that I talked about, does not show any noticeable relationship to age. That is, readiness for change is, on the average, high in all age groups. If this variable really predicts how people would act in case of change, (and we do not have any evidence on this yet) it would dispel the notice that older people have a harder time putting up with change than younger people have.

We do know that attitudes and age are unrelated on this point.

DR. JACOBSON:
This attitude, however, is related to the level of education?

DR. HARDIN:
Yes, and it is related to the occupational level within the company, so that the higher the job evaluation points, the more ready a person was for change.

Readiness for change was higher among those with higher social class backgrounds than lower social class backgrounds.

Job opportunities

The government situation as reported in Mr. Lesinski's statement:

> From the Federal government's point of view, there has been no great problem on this point, as yet.
>
> The problem has been to keep electronic data processing workers in government service rather than to lose them to private industry.
>
> Salary scales of private firms in electronic data processing work are still sub-

stantially higher than in government. For instance, here are some comparable annual salaries:

	Top Annual Salary*	
	Government	Industry
Senior programmer	$ 9,500	$12,000
Junior programmer	7,000	9,000
Computer senior executive	14,000	20,000
Computer junior executive	10,500	13,500

*Knight Survey: *Personnel Problems of the U. S. Government*

The Federal agencies have made some adjustments recently in Federal electronic data processing salaries, by reclassifying and by paying top-of-the-grade salaries, but Federal agencies continue to lose personnel to industry.

During a discussion of the overall employment picture, which is not pertinent here, Dr. Hardin remarked that: ". . . If we have a growth of new industries, a rapid growth, they will require clerical workers as well, and this may help handle the displacement problem. I remember what an economist who studies technological change very intensively used to say, that we always think we will run out of investment opportunities, and out of new products, because we cannot see the new products that are going to come in five, ten, or fifteen years from now. So, if we make a projection on the basis of present events, I am sure that we are very likely to understate the growth in demand and growth in employment."

Dr. Hardin also suggested that the way the economy goes is largely determined on the types of programs that the government undertakes, for instance, a total push on space would cause a need for engineers, scientists, mathematicians and data processing. This would be one direction which would have decided implications for clerical work. On the other hand, if the total economy were geared to the production of food for newly developed countries, the labor force would have an entirely different complexion. What we do with this technological change will bring various results.

"We can just let it go to waste, but we can also use it fruitfully in many ways."

Job possibilities for the lower echelon of clerical workers were explored when Mr. Roll mentioned the gap existing between a bookkeeper and a programmer. With the elimination of the previous steps from lower to higher level, how does anyone make a transition?

MR. FLAKOLL: It wouldn't be unusual that people in data processing areas of specialization would become more dominant in the management activities of the service industries as time goes by.

DR. JACOBSON: People associated with the systems concept (systems, the computer, data processing) would not only become more valuable in the future, and be more likely to receive promotions in the service industries, but also in industrial productive industries.

We must remember that the computer is a system. It is an organism on which a business operates ultimately. It becomes the vital organ and line of communication.

MR. ROLL: Mr. Douglas is not worrying about management; he is worrying about the worker, and that is where the big problem is, in the non-management field.

People in data processing area would be more dominant in the management activities . . .

ADRIAN A. FLAKOLL

Our society is becoming less of a producing society and more of a service-industry society.

ARVID W. JACOBSON

DR. HARDIN: If the destruction of the middle-management layer takes place, that would in a way help unionize the routine office workers by giving them the feeling that they cannot advance to management levels, and create a permanent wage earning class of non-supervisory level.

MR. DOUGLAS: I think this has already happened in most of the places where they have installed this equipment. Mr. Roll is correct in saying that there is no path of progression into management.

MR. ROLL: I don't say there is no path, but I say it might be limited. It may be a little more limited than it was previously, but I am not sure.

MR. DOUGLAS: The clerical employee now goes to this gap that you speak of, and the fellow above that is not as much a management man as he is a professional man.

He doesn't necessarily become a part of the management, as he is a systems man. He is a professional technician on the operation of the system and the improvement, and the increasing use of the machine by adapting its capabilities to the problems of the company.

The only experience I have had where anyone bridged this gap was one case where the company took two clerical people and sent them to a professional school. When they came back, they were at the other end of this gap. And this has very definitely created the impression in the minds of the clerical workers that they will be permanent wage earners unless they go back to school.

DR. JACOBSON: The automatic programs that are coming into being make the task of the programmer simpler. He doesn't need to know all of the programming steps. He simply states his problem, almost as he would state it orally or in writing, and the computer takes it from there.

MR. ROLL: It will help to bridge that gap because this person that I am talking about on the lower level has to know quite a bit about that system and how it affects all of the accounts, so he might very well move into the programming field if it were simpler.

MR. THOMSON: We have 58 new technical and managerial jobs in the data processing center that did not exist before, and there are 200 people in that operation.

Five of the operators of the computers are men, secured from our mail room and card punch group. They were high school graduates. We trained literally hundreds of our own people; we did not go on the outside, and there has been considerable upgrading. It is not inconceivable that those people who show talent and will get up at 6:30 in the morning to watch the television math program can rise still further.

DR. JACOBSON: Or attend special schools. We must keep in mind that as science and technology become more involved there is need of more and higher skills.

Our society is becoming less of a producing society and more of a service-industry society.

MR. PAIR: This pertains to supply and demand. I am presenting NOMA's attitude. We have 180 chapters across the country,

and in Canada; probably 200,000 member firms. NOMA was so concerned about this problem of actual shortage of office employees that they called a conference on business education last March in Alexandria, Virginia, to find out why schools were not training and delivering more well trained office workers to business. Across the country we have many unmanned desks.

Across the country we have many unmanned desks.

PAUL M. PAIR

EDITORIAL NOTE: This report, covering the first two areas of discussion at the roundtable, gives the thinking on the scope of the problem, the psychological influences, and the job opportunities for personnel in computer-oriented firms.

Next month we will continue the report. Still to come — the education and retraining necessary to qualify dislocated people for other jobs, and the responsibility of various segments of our society for planning and solutions.

Coming Events

DEC. 12 - 14

Eastern Joint Computer Conference, IRE, PGEC, AIEE and ACM.
Sheraton-Park Hotel, Washington, D. C.
Contact: Program Chairman, Bruce Oldfield, IBM Corp., 326 E. Montgomery, Rockville, Md. Women's Activities, Ethel C. Mardon, National Bureau of Standards, Washington, D. C. Exhibits, Charles Phillips, Office of Secretary of Defense, Washington, D. C.

DEC. 14 - 16

Forum on Legal Questions Raised by Computer Use in Business, Industry and Government.
Joint Committee on Continuing Education of the ALA & ABA.
Statler Hilton Hotel, Los Angeles, Calif.
Contact: John E. Mulder, Director Joint Committee, 133 S. 36th St., Phila. 4, Pa.

DEC. 27 - 30

American Statistical Association Annual Meeting.
Roosevelt Hotel, New York, N. Y.

1962

JAN. 9 - 11

Eighth National Symposium on Reliability and Quality Control, IRE, PGRQC, AIEE, ASQC and EIA.
Statler Hilton Hotel, Washington, D. C.
Contact: A. H. Drayner, Martin Co., Mail Sta. 17, Baltimore, Md.

FEB. 19

ADAPSO Management Symposium.
New York, New York.
Contact: W. H. Evans, Exec. Vice Pres., ADAPSO, 1000 Highland Ave., Abington, Pa.

FEB. 7 - 9

Third Winter Convention on Military Electronics, IRE, PGMIL.
Ambassador Hotel, Los Angeles, Calif.
Contact: Wm. L. Johnston, c/o IRE Los Angeles Office, 1485 So. LaCienega, Los Angeles, Calif.

FEB. 12 - 20

American Bar Association Midyear Meeting.
Edgewater Beach Hotel, Chicago, Ill.

MAR. 4 - 9

SHARE IBM 701, 704, 709, 7090 User Group Meeting.
Denver Hotel, Denver, Colo.

MAR. 26 - 29

IRE International Convention.
Waldorf-Astoria Hotel, Coliseum, New York.
Contact: E. K. Gannett, IRE Headquarters, 1 E. 79th St., New York 21, N. Y.

APR. 2 - 4

NABAC Eastern Regional Convention.
Lord Baltimore Hotel, Baltimore, Md.

NEWS SUMMARY

GENERAL

The National Institutes of Health plan to give some support to regional instrumentation centers for biological and medical research. The centers are already deep in work with computer research in genetics, heart studies, and functions of the nervous system.

Advanced Scientific Instruments is the third computer producing company in the Minneapolis area.

Westinghouse Electric and Remington Rand are beginning a joint development of new automatic control systems using electronic computers.

General Electric's new Information Processing Center in Chicago is equipped with GE 210 and 225 systems.

Standard Financial Corporation's financing and office equipment leasing services have been transferred to SFC Acceptance Corporation.

American Management Association will conduct 20 courses during its fall and winter schedule. The Data Processing and Management Information Systems course will be given November 27-December 1, at AMA Academy, Saranac Lake, N. Y.

Bendix reports new records for G15 orders in second quarter.

Philco Computer division opened a new office in Seattle.

Baltimore Business Forms announced plant expansion for forms production.

RCA has new quarters in downtown Seattle.

C-E-I-R and ARB Surveys have merged. In October, C-E-I-R broke ground for new quarters in Boston.

EXPANSION

Data Analysis Corporation, subsidiary of Dynalectron, will operate in the field of automatic data analysis, handling, and processing.

Charles W. Adams Associates, consultants, have new west coast offices in Anaheim, Calif.

Datapulse Inc. is a new California company which will make digital computing and data handling equipment.

Univac has created an Industrial Component Sales department which will market data processing equipment and other specialized products.

General Dynamics has formed a new division, General Dynamics/Telecommunication.

System Development Corporation dedicated its $3 million research laboratory at Santa Monica recently.

NEW USERS

Trunkline Gas Company, Houston, installed the first Recomp III.

Eight retail stores in Tulsa have the nation's first citywide charge account numbering system using the Diebold Alpha Numeric System (DANS).

Delta Airlines unveiled its fast communications system, Bell's Developmental Line Switched Teletypewriter Service.

Her Majesty Company claims to be the first garment manufacturer with an IBM 1401.

Mohasco Industries used a Dial-O-Verter system to transmit a million words without a single error.

The U. S. Army's Finance Center, Indianapolis, dedicated its data processing center and Honeywell 800.

Manufacturers Trust Company completed installation of the IBM 1401/1412 systems in its Data Center.

	Scott Paper Company is using IBM 1401/RAMAC 305 to control inventory and automatically fill orders.
MORE USERS	The Budd Company is on the air with its 1401.
	UCLA has installed the first IBM 7080 system on any campus.
	The first 7080 outside the U. S. is being installed for Canadian Pacific.
	Union Tank Car Companies have scheduled tank car rental as one of the first jobs for their new 1401.
	Datamation, Inc., a New Jersey service center, is in full swing with its IBM 1620.
	The Institute for New Products, Inc. is using computers to help it serve as a clearinghouse for new inventions.
	The Office of the Medical Examiner, Philadelphia, is using a Jonker information search and retrieval system to aid public health.
	Manhattan Savings Bank began handling savings accounts on NCR 42 window posting machines, transmitting by telephone to the NCR 304 at central data processing.
	The University of Michigan has a digital data recording system on order from Datex Corporation.
	Equitable Life Assurance Society of the U. S. is awaiting its Honeywell 800.
	Buffalo Insurance Company has ordered a Univac Solid State.
ON ORDER	Associated Press is to get two IBM RAMAC 1620s for electronic stock tabulation and transmission of stock market tables.
	Harleysville Insurance Company has ordered IBM 1410-1401 systems.
	The First National Bank of Chicago ordered a complete bank system.
	Krey Packing Company awaits an NCR 315, the first in meat industry for processing formula meats.
	British European Airways have a contract with ITT for the first phase of its seat reservation system.
	Associates Investment ordered three NCR 315s with CRAM.
	Northwestern Mutual Insurance Company is waiting for an RCA 301 to join its functioning RCA 501.
	Lenkurt Electric and the First Camden National Bank and Trust have both ordered RCA 301 systems.
FOREIGN	LaFranco Argentina-Compania de Seguros has inaugurated the first IBM 1401 system in Argentina. The expansion of data processing equipment in Latin America is continuing.
	C-E-I-R (U. K.) Ltd. opened its first center in London with an IBM 7090-1401 computing system.
	Litton Industries has acquired an interest in C. Plath KG, of Hamburg, Germany.
MILITARY	Burroughs Corporation has been selected as the systems hardware contractor for USAF command and control system (AF System 425L). MITRE Corporation and Systems Development Corporation are the associate contractors for the system's programming.
	Planning Research Corporation has been awarded a contract for the compilation and analysis of flight control systems component reliability data for Aeronautical Systems Division, AFS Command.
	The Atlantic Fleet will be maintained through use of an IBM 1401 system at Bayonne Naval Supply Center. This will provide last-minute status of ship needs for overhauling purposes at east coast ports.

NO GAME!

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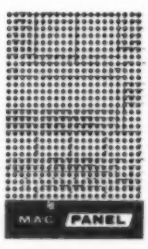

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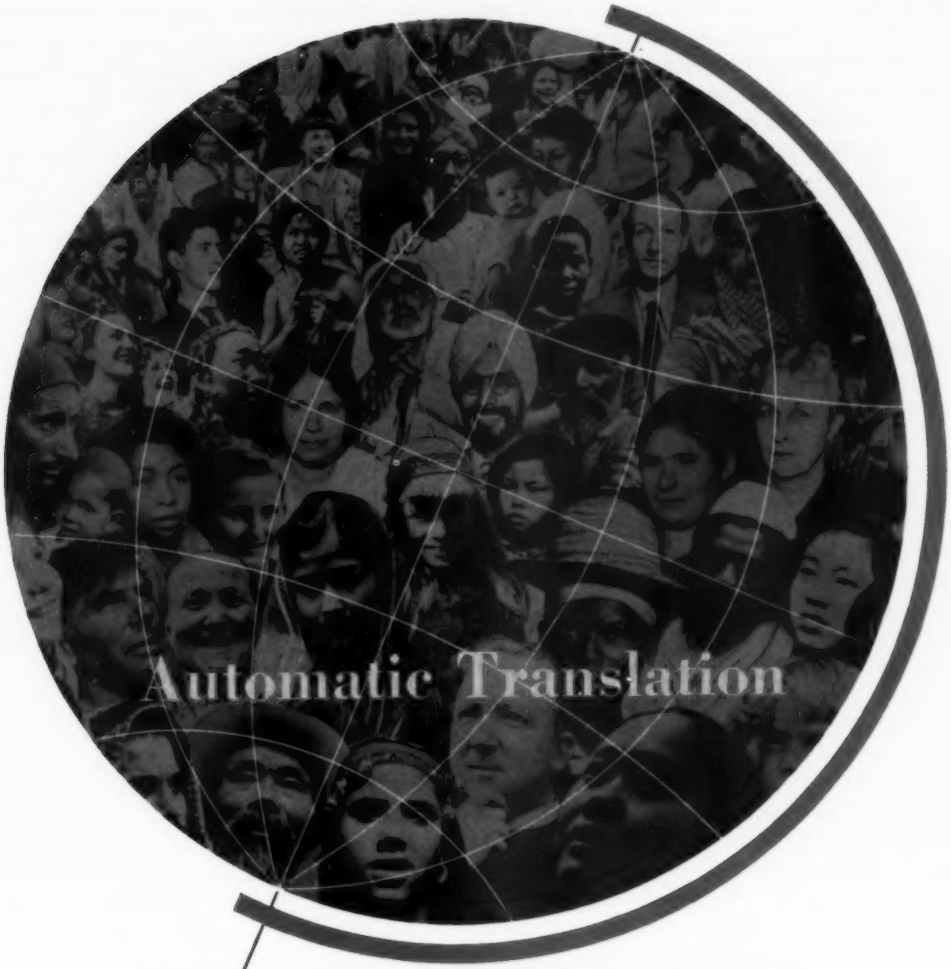

Automatic Translation

A report from the international conference

By Dr. L. A. Steiner

ALL OVER THE WORLD data processing machines and computers are standing by, waiting for instructions to transfer words from one language to the other in such a way that humans will understand the whole sentence and the sequence of sentences; waiting for the results of study, research and experiment now being carried out by groups of programmers, philologists, mathematicians, lexicographers, system engineers, and computer designers.

Some of these brave people, in fact 350 of them, joined lately at the National Physical Laboratory at Teddington, England, to listen to each other and to try to understand each other. A very difficult task, because the language of machine translators is a new one, created partly by the appearance of unexpected difficulties and partly by the fact that in the past most groups were working in isolation and talking largely only to themselves. It was the first International Conference on Machine Translation and Applied Language Analysis, with contributions — in order of volume — from the U.S.A., England, France, Italy, Japan, and the U.S.S.R., lasting four days, guided through 37 papers by patient and efficient organizers. Color was provided by a few Latin voices and by the large number of delegates speaking fluently both English and Russian with an American accent. Simultaneous translation was provided by two French and two Russian interpreters. How they managed to do the job without punched tape and transistors is one of the mysteries that remain to be solved.

(continued on next page)

The problems

At first thought, it seems that it will be sufficient to construct a large enough machine dictionary in which the machine will find each word and print out the equivalent word in the other language. Such a dictionary would need a storage capacity for 500,000 words, counting all inflections, declension, and other forms in which a word may appear. Granted the expense of a large data processing machine, the processing of a single word would be no problem at all, but a combination of say 10 words in a sentence, which would preserve its meaning when transferred into another language, is still a formidable problem.

Many words have no exactly corresponding meaning in the other language, and still more words depend for their precise meaning on neighboring words, or on a wider context. The English word "do"has several columns in any dictionary worthy of the name; the word "out" can be an adverb, an adjective, a noun, an interjection, a transitive verb and, of course, a prefix. Indeed, the ambiguity of many words, i.e. the fact that they have no fixed, singular meaning, and that the use of words developed in the various languages differently, that the formation of sentences is subject to widely different rules and to exceptions from the rule, when a machine can work to precise rules only, are the main problems of translation by machine. In addition the machine has to find the rule which it is going to apply from the text presented to it.

The practical importance of a solution has induced an expenditure of two million dollars a year in the U.S.A., provided mostly from government funds, and many of the problems are now being tackled from several directions.

A machine, being void of intelligence, can attack the problem of translation only from the form of the words and of the text, and must be also of limited size in order to be useful, though no portable translating machine is in sight yet.

The single word

Economy in the size of the dictionary dictates in many cases as short an entry as possible, though a dictionary of full length words is available in a very small size, see Figure 1. It is, however, often useful to split off the ending of a word, chiefly of inflected Russian words, to enter the remaining stem in the dictionary and to use the split-off portion for interpretation. Many chemical terms can be broken up into fractions and re-built in the other language in the same or in a different order. There was a suggestion made to use the length of the word as a feature by which it can be recognized. The effect of the article (definite "the," indefinite "a" and no article) on the meaning of the word and of the sentence was well demonstrated and discussed. The importance of such study is obvious, if one considers that Russian has no articles and the problem is how to avoid ambiguities when a sentence is transferred into a language which depends on the article for definition. All these and other suggestions are directed towards obtaining from the form of the word as much information as possible and to arrange the sequence of the entry in the directory in a most economical manner. A machine dictionary if printed would, therefore, look different from the normal book form.

Sentence programming by data processing

The machine dictionary must have attached to its entries also all the information available of the possible application of the entered fragments of words, of complete words, or of combination of words. Programming and data processing on a large scale could be considered only after the additional information as to the possible application of an entry is available.

However, before a program can be written for the machine to construct a sentence from the stored fragments, the programmer must know all about the structure of a sentence, both in the source language and in the target language. The study of syntactic structure should precede syntactic programming; 18 papers, half of the total, were specifically devoted to this problem, ranging from abstract studies of syntax to the use of special purpose computers.

Attempts are being made to predict words that may follow each other and also to reduce the physical distance of words in a sentence in order to make

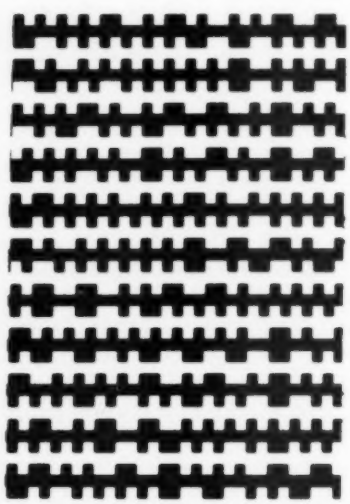

FIGURE 1

Part of the tracks of a Russian-English machine dictionary, magnified 300 times. The whole dictionary, including idioms, can be stored in a ring on a ten-inch glass disk.

Courtesy: *IBM*

a sentence more amenable to processing by machine. How to reduce the effect of multiple meaning, how to write a program for the most plausible structure and the creation of a new, purely machine language are other considerations presented at the conference.

To construct a sentence just by collecting a few words and giving them instructions by machine to combine themselves under given rules (just like telling a child what it may do and what not) is one of the methods which were tried in order to gain insight into sentence construction. Grammars which are pure invention, i.e. based on symbols only, were also studied.

A proposed procedure for the automatic translation of Japanese into English turned out to be an attractive variant of that from Russian into English. In the latter an attempt is being made to predict from the beginning of a sentence what may follow; in Japanese the last word is being taken and the word prediction appears to be no longer correct for the reversed procedure.

Human translation as opposed to machine translation was the subject of two papers from Milan which stressed the essential difference between the two techniques. All practical examples from Milan refer to translation from Russian into English.

U. S. contribution

The contribution of authors from the United States was formidable by all standards: 23 out of 37 papers came from the States, i.e. from Harvard, M.I.T., the Universities of California, Georgetown and Wayne State; the N.B.S.; the RAND Corporation, IBM, Lockheed, Ramo-Wooldridge, and the Air Force. Such wealth of knowledge and research was bound to make a great impression. In the past, Harvard went to great length to provide the National Physical Laboratory with their dictionary and the willingness with which help and information was offered should be acknowledged. U. S. government funds support a number of research groups abroad.

Italy and France

Italy and France contributed three papers each. The French showed original and spirited concepts. The Italian group, centered in Milan, contributed a scholarly treatise on the role of the definite and indefinite article and two papers on the comparison between human translation and transfer by machine, this being a treatise on soul versus machine.

Japan and U.S.S.R.

Each contributed one paper. The first was an attempt to create a universally applicable syntax; the second—not available in print yet—on language analysis by algorithms.

Great Britain

It is only fair to leave last the home team which did not do too badly, having scored six papers, three runs being made by Cambridge, chiefly on basic research into the intricacies of Language and Interlingua, two by the National Physical Laboratory on splitting of words and on interpretation of fragments, and one by Birkbeck College, an old established club for numerical integration and mechanical resolution of linguistic problems.

Results and trend

The first machine translation was demonstrated in 1954, using a dictionary of 250 words. A few simple sentences of identical structure were given to the machine which produced a word for word translation in fairly readable English.

In 1961 a translation was demonstrated, using a dictionary of 5,000 words, and producing a word for word translation of a passage from Pravda, i.e. translating structures of some, though restricted, variety. The result, a little bruised but understandable, was printed out at a rate of about 1,000 words per minute. That speed was obtained by recording, on tape, a very slow input.

Leaving aside any ambition to translate poetry, or even to obtain prose of literary merit, and restricting our ambition to a purely utilitarian application, we have reached the point where under favorable conditions a Russian text can be transferred into English by machine. An expert in the subject will understand the text and should be able to edit the machine version for use by a wider public, if needed.

So far as can be seen at the moment, a machine, being programmed by a limited set of rules, will have a style of its own. Following essentially the original word order, it will produce a characteristic word pattern of prose, as characteristic as Shakespeare, Goethe or Dante are to poetry.

Apart from the purpose of translation, the techniques now available and under development will be found useful in providing material for abstracting scientific literature and for automatic information retrieval.

As a by-product, we know now more about language than we knew before and will learn a lot more in the future. Another aspect is that with advances in speech analysis it may be possible to print the spoken word in correct spelling.

The production of translation machines is handicapped not only by lack of knowledge of how to communicate between man and machine but also by the very slow input, now by punched cards. However, as soon as machines for automatic character recognition will be available (perhaps in two years or less), translation by machine will appear as a very attractive commercial proposition. ■

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Extending Man's Intellect

Theme of WJCC for 1961, some highlights

IN THE OPENING SESSION of the Western Joint Computer Conference, held in Los Angeles May 9-11, Harry H. Harmon of the System Development Corporation, Santa Monica, California, said: "The revolutionary impact of the electronic computer on our society may well be equal to that of atomic energy — and may actually surpass it in the long run."

The theme of the conference—"Extending Man's Intellect"— suggests that the "revolutionary" aspect of computer science is more than a technological and material one; that it is now entering the realm of intelligence or, at least, mentality.

The WJCC is an annual conclave at which the most advanced thinking in computer technology is presented. Like its counterpart, the Eastern Joint Computer conference, the WJCC has been sponsored by the National Joint Computer Committee. At this 1961 conference it was announced by Morris Rubinoff, chairman of the committee, that future Joint Computer Conferences will be administered by the American Federation of Information Processing Societies (AFIPS).

AFIPS, in Mr. Rubinoff's words, "is a society of societies organized to represent through a single body the professional societies of the American computer and data processing world." The main objective of the society is to promote information flow between members of different societies.

Since the 1961 WJCC does present the most highly sophisticated study and research in America, this report will discuss what we feel to be the highlights thereof. Of the 58 papers presented in the conference's manual of proceedings,* several were written by psychologists and other specialists in various social sciences — an indication of the interdisciplinary nature of computer sciences.

Such topics were discussed as digital simulation, modeling human mental processes, problem solving and learning machines, information retrieval, and automata theory and neural models. Several sections of the conferences were, of course, devoted to pure technological presentations, but the trend toward computers having "intellectual" abilities was clearly the dominant chord of the conference. Following are some of the more colorful observations.

Digital simulation

"A direct consequence of the computer," Mr. Harmon noted, "is the burgeoning activity which collectively goes under the name 'simulation'. The growing awareness and popularity of this field of activity is evidenced by a recent article in *Business Week*, in which a parallel is drawn between the group of simulation experts and the group of painters known as the Futurists.

"Just as the art works might bear no direct resemblance to the objects for which they were named, so the mathematical formulas, flow diagrams, and computer outputs bear no direct resemblance to the world which they simulate. Moreover, this symbolic art 'represents a massive assault on tradition — in this case, the traditional art of managing large organizations'."

"Perhaps the simplest and most direct definition of simulation," Mr. Harmon suggested, "is merely the *act of representing some aspects of the real world by numbers or other symbols that can be easily manipulated.*"

Accentuating the use of simulation as a research tool, Mr. Harmon briefly described such applications as operational gaming, management control, social control, and vehicular traffic control. Defini-

*Copies of the 661-page volume of conference papers may be obtained from any of the sponsoring societies, at $4.00 per copy: Institute of Radio Engineers, One East 79th Street, New York 21, New York; American Institute of Electrical Engineers, 33 West 39th Street, New York 18, New York; and Association for Computing Machinery, Two East 63rd Street, New York 21, New York.

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tive studies of these uses were presented by Joel Kibbee of Remington Rand, Univac, and Andrew Vazsonyi of Ramo Wooldridge.

"Management games," Mr. Kibbee observed, " . . . are primarily of concern to the educator and to the research scientist, but since many of these games are played with the aid of an electronic computer, they should be of interest to computer people in general." He pointed out several uses for games in management, including one in which each manager controls an entire business operation and the "winner" is the one who finished with the largest accumulated net profit. The technique is to throw the executives into a situation and make them organize, delegate, decide, etc.

Asked whether any games exist for training teachers or programmers, Mr. Kibbee mentioned the Steps game of SDC, "which is used to train supervisors of programmers but not to teach the technique of programming itself."

Mr. Vazsonyi described an on-line management system, a Management Decision Game, designed to train executives in the planning and control of large-scale research development and production programs.

Aaron Glickstein and S. L. Levy of the Midwest Research Institute then described a general digital simulation model, "which can duplicate traffic flow on a 17,000 foot section of freeway, including two on-ramps and two off-ramps, and can be used to economically evaluate alternate design criteria." The simulation allows planners not only to evaluate without first building a freeway, but it also allows them to perform experiments impossible to perform with actual traffic.

M. A. Geisler and W. A. Steger of the RAND Corporation described simulation for the development of a military weapons system.

Modeling human mental processes

Delivering the opening paper of this session, Herbert A. Simon, also of the RAND Corporation, stated, "There now exist at least a half dozen computer programs that simulate some of the mental processes that humans use to perform problem-solving, learning, perceiving, and thinking tasks."

"The goal in this type of simulation," Mr. Simon stated, "is to obtain understanding of the human mind by imitating it." He noted four categories of mental simulation:

1. Abstract simulation of adaptive, goal-seeking, learning mechanisms, in order to understand the nature of organisms in general, rather than the human organism in particular.

2. Simulation of the sensory-perceptual processes by which humans recognize visual and aural patterns and symbols, in order to ascertain the cues that humans use to recognize the basic phonetic units of spoken language. Partial successes have been recognized in this attempt.

3. Simulation of the self-organizing capabilities of neural nets, in order to determine how the patterns mentioned in category two are acquired by the nervous system.

4. Simulation of the symbol-manipulating or information processes employed in learning by rote, in attaining concepts, and in solving problems, in order to form an information processing theory of human mental processes.

In discussing the long-range goals of simulation, Mr. Simon stated: "Perhaps the largest single gap at present — and one that is not filled by any of the work to be reported today — is in programs to explain long-range human memory phenomena. I will venture the personal prediction that filling this gap will soon become crucial to progress in the whole field of information retrieval."

E. A. Feigenbaum of the University of California then discussed the computer program called Elementary Perceiver and Memorizer (acronominally designated as EPAM), which simulates the behavior of subjects in experiments involving the rote learning of nonsense syllables, and which attempts to state quite precisely "a parsimonious and plausible mechanism sufficient to account for the rote learning of nonsense syllables."

(continued on next page)

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These simulations, he pointed out, are models of human mental *processes* and not mental structure. They are purely psychological models. They conceive of the brain as being an information processor, capable of doing only one (or very few) things at a time.

Julian Feldman of the University of California then described a modern high-speed digital computer, used "to simulate the behavior of individual human subjects in a classical psychological experiment where the subject is asked to predict a series of binary events."

In the final paper of the session Earl B. Hunt and Carl I. Hovland of Yale University discussed a model of human information processing, which has been constructed, and which uses a list processing, digital computer program. "The program's input consists of description of objects in terms of dimensions and values. The universe of objects is divided into two or more sets, and the program attempts to form a decision rule, based on the descriptions of the objects, which can be used to assign any previously presented or new object to its correct set."

The program is a list-processing program written for IBM 709-7090 data processing systems. The original processing programs were written in Information Processing Language V, but Hunt and Hovland stated that they were in the process of conversion to LISP.

Problem solving and learning machines

"Work on artificial intelligence," Marvin Minsky of the Massachusetts Institute of Technology reported, "is proceeding at a slow, apparently steady, rate . . . In the past it seems to have taken two or three years for each significant advance." Mr. Minsky's explanation of this slowness is, first, that much time has been required for the development of programming languages and systems suitable for the symbol manipulation processes involved, and, second, that the methods which worked quite well for simple problems were not adequate for the more complex ones. As problems become more complex, he stated, we cannot afford a complete trial and error system. The search is so difficult and so costly that total failure cannot be allowed. With simple problems, such as playing tic-tac-toe, it is practical to try a number of methods, discarding those which are inadequate. With extremely complex problems, the searching must be done systematically and expensive experiments must be very carefully designed. Minsky feels that internal language processing is an urgent need, but that little progress has been made in this area to date.

A team from M. I. T.'s Lincoln Laboratory described a fascinating question-answering program called "baseball." The program answers questions phrased in ordinary English about stored data. The program reads the question from punched cards, looks up the words and idioms in a dictionary, determines phrase structure and other syntactical facts for content analysis, extracts the requested information from the specified data, and, finally, prints the answer.

"Baseball" is the first step toward enabling men to communicate with computers in natural language.

The final paper in the session, presented by John McCarthy of the M. I. T. Computation Center, was a preliminary report on the development of a mathematical science of computation which, it is hoped, will overcome the chief limitation on what we have been able to make computers do so far. This limitation, Mr. McCarthy feels, is our own weakness as programmers.

Information retrieval

Progress in information retrieval was reported by Don R. Swanson, M. M. Kessler of M.I.T.'s Lincoln Laboratory, and Robert T. Moore of the National Bureau of Standards.

Commenting on the current state of "the art," Mr. Swanson stated, "The obvious fact that the world's store of scientific information is increasing at an exponential rate has apparently enjoyed independent discovery by scores of science information writers during the past few years. On a suitably scaled graph, any rising exponential curve tends to produce an hypnotic effect of impending crisis. Now an atmosphere of alarm, since it is conducive to action, is no doubt beneficial, but only provided such action is properly directed."

Mr. Swanson suggested that the information increase rate is really not at all out of balance, but is actually quite normal. "Many profound questions, presently unanswerable," he noted, "should be diligently explored, not in an atmosphere of crisis but in recognition of their long-term fundamental importance."

He pointed out that automatic abstracting of information is still an unsolved problem — and a critical one. No rules have been formulated which are better than "Select title and first sentence of each paragraph." It is desirable to cut the size of a text drastically without an accompanying loss of information. To date, however, such an accomplishment has not been successfully demonstrated.

Mr. Kessler's report pointed out that definite patterns do exist for the flow of technical information. "Quantitative data are presented on the flow of information between cultural and functional groups, and between past and present. An analysis of the numerical data indicates that these flow patterns are deeply rooted in the dynamics and evolution of scientific thought and engineering development. The analysis also discloses that extreme asymmetry exists between journals in their capac-

ity as carriers of scientific information."

Proposing one possible solution to the problems faced by large information retrieval systems, Mr. Moore described a screening method for reducing the excessive processing times often encountered now. Two tools are suggested for this method: "1) A screening system to allow multi-level processing of material, and 2) pre-processing of the files to allow block rejection of documents not answering a retrieval request." Thus far this system had only been tested theoretically, but, Mr. Moore assured, success was promising enough to warrant detailed testing of real files.

Automata theory and neural models

W. Ross Ashby of the University of Illinois began this session with the coldly realistic statement that, contrary to traditional belief, the human brain is not unlimited. It has, in fact, the same limitations as does a computer, he added. "Man and computer show their powers alike, by appropriate selection. But both are bounded by the fact that appropriate selection (to a degree better than chance) can be achieved only as a consequence of information received and processed. Machines can be made as intelligent as we please, but both they and man are bounded by the fact that their intelligence cannot exceed their powers of receiving and processing information."

H. D. Block of Cornell then gave an introduction to *perceptrons* — the self-organizing or adaptive systems proposed by Frank Rosenblatt as greatly simplified models for biological brains, whose main objective is to explain how the brain performs, its functions in terms of its structural components. Murray L. Babcock of the University of Illinois then discussed the physiology of automata.

In addition to these sessions briefly described, the conference had sessions in microsystems electronics, progress in computer circuit design, new hybrid analog-digital techniques, automatic programming, memory devices and components, applied analog techniques, pattern recognition, and computers in control.

Perhaps the chief significance of the conference was the exposure it gave to the increasing concern with computers for intelligence purposes. The conferences gave a preview of many advanced systems that we can expect in the not-too-distant future; it showed a new interest in computers being shown by psychologists and biochemists — people who, in the past, have been largely divorced from computer technology; and, finally, it revealed a strong trend toward computers being designed for total systems purposes.■

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Marien on FORMS —A Monthly Feature

NEW—in the Systems Forms Field

RAY MARIEN

SO MANY NEW DEVELOPMENTS have taken place recently in the systems forms field, that I thought I would take time out to record a few for your interest. Not only have the forms themselves been undergoing important structural changes to meet the requirements of the latest data processing equipment, but an outstanding entry in the forms composition field has just been announced, which should be of tremendous help to the average office forms control installation.

New carbon

First, the new forms developments. The Philip Hano Company, Inc. of Holyoke, Massachusetts, producers of business forms, have come out with a new carbon-coated tissue sheet which they call *49-15*. It has been developed especially for high-speed printers, and according to Hano, has been tested and proven at large data processing installations.

The big virtue of the new carbon sheet is that it reputedly will perform as well as premium sheets *without* costing any more than standard grade carbons.

This new carbon, 49-15, has been brought out specifically to combine the features of the hard, low-smudge carbon with the very sensitive properties of the old intense inks. That combination is necessary because of the action of the key-strike in the high-speed printers. Unlike conventional equipment, where the type struck the front of the paper and forced the paper against the platen, in the new printers the type face is forced against the front of the paper by a hammer blow from the *rear*. And — as it is revolving at a high rate of speed when it hits the paper, without actually stopping — it is in essence "in flight" at the time of printing. This, coupled with the fact that there is no platen involved, calls for a radically different type of carbon paper than that used heretofore.

The Hano 49-15 carbon affords *complete* transfer of the carbon onto the copy sheet. The carbon sheet, when viewed after striking, appears to be completely transparent at those points where the image was transferred. Because of the "complete" transfer, the manufacturer recommends that regular weight tissue be used, thus avoiding the premium charge for lighter weights. They also point out that this would incidentally lessen the chance of trouble as the forms run through the data printing equipment.

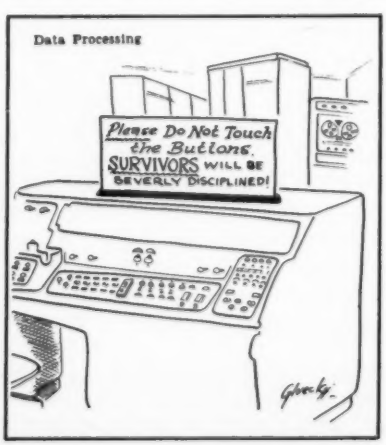
Speediflex

Another relatively new forms construction is the Moore Business Forms *Speediflex*. While this has been on the market for a number of months, this is our first opportunity to afford it the attention it clearly merits. As the Moore people state, it is a "revolutionary concept" in multiple-fastened forms. The interleaved carbons are cleverly fastened in a flexible manner with tiny slits providing the maneuverability needed in continuous forms revolving around a curved cylinder. The makers of the early automobiles well recognized that the inner wheels do not form as large a turning circle as the outer ones, and therefore, a compensating factor must be built in which permits the inside wheels to revolve slower on a turn than the outer ones. This is called the "differential." Exactly the same principle applies to the *Speediflex* form construction. The flexible carbons give the form something akin to "stretchability" and permit the parts to move independently of each other, within limits of course. This eliminates tearing or wrinkling at the fold and permits each part to move freely and exactly *into register* at the machine writing position. In effect, it acts as the "differential" for a continuous form.

The net result is a smoother flowing form with considerably better register and much less chance of fouled-up forms during the run. And, an important extra is the fact that the number of parts are no longer limited by the "turning" factor.

Selectric typewriter

The last new item is not a form but a *machine*. It's the IBM *Selectric* typewriter. An electric typewriter, priced very moderately, it operates on a revolutionary (there goes that word again!) new principle that eliminates the typewriter "key." It has a single element typing head, about the size of, and roughly similar to, a metal "golf ball." This moves along a carrier and hits the paper as fast as a typist can pound away, *without* pile-ups. The *big* feature, as far as the forms specialist is concerned, is the interchangeable type head. This interchangeability means that the Selectric can be used to compose business forms. A variety of type faces are essential to good forms design. This machine makes them readily changeable and permits the typist to "compose" a business form at the *same* machine used for regular typing. To my mind, its possibilities in the office form composing field are unlimited. IBM has yet to introduce "form design" type faces, but undoubtedly it is only a matter of time before the variety of faces available is infinite, and the forms specialist can use his everyday typewriter (provided it's a *Selectric*) for forms composition.



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DeParis on EQUIPMENT —A Monthly Feature

Feasibility Studies

JOSEPH R. DE PARIS

THE FEASIBILITY PHASE of a computer study program is one which is accorded widely different treatment from one organization to another. At one end of the pendulum is the feasibility "study" which amounts to no study at all or at best is just a light scratching of the surface; at the other end is the study in depth, a substantive, penetrating analysis of the situation culminating in procedural flow charts, program block diagrams, dollar benefits, et al.

The depth of the feasibility study required will vary from situation to situation. In some cases just a surface study will establish that sufficient benefits, tangible and intangible, will accrue to justify installation of the computer. In other cases, especially where the ramifications are many, a protracted study will be needed to unearth the factors based on which a value judgment may be made.

In some organizations the intangible benefits may have sufficient appeal to sway the decision in favor of the computer. These benefits, though difficult to measure and virtually impossible to assign a dollar value, are, nevertheless, real and should not be overlooked. Naturally, one factor may be more significant to one company than it is to another, and accordingly, will be given appropriate weight in the final decision. For instance, in a dynamic situation where volumes are increasing, where demands for data are becoming more complex and varied, where the forecast is for growth and expansion, certain intangible factors assume great importance. These include the greater flexibility which the computer offers, its ability to absorb tremendous increases in volume, the opportunity to streamline and integrate procedures.

However, despite the influence that the intangible factors may exert on the decision, no better basis for justifying a computer has been found than one based on tangible benefits which can be translated into dollar savings.

Conversion costs

The feasibility study undertaken should have, at the least, sufficient scope to set forth the economic benefits predicted for the installation. The study group should estimate, based on the facts available and its best appraisal of those facts, the point in time when the installation will break even and start producing a profit. This breakeven point *does not* occur the first month in which the cost of the new complement of personnel and machines is less than the displaced complement of personnel and machines. No, indeed! The breakeven occurs only when the new installation's cost has been less than the old installation's cost for a period of time sufficient to pay back *the cost of conversion* to the computer system.

This factor, conversion cost, must be considered in any determination of savings and breakeven points. Conversion costs are usually significant and often more than might be imagined. Too often, at least in part, they are overlooked or underestimated.

If the estimated annual savings are $25,000, it will take four years to reach breakeven if the conversion costs are $100,000, eight years if they are $200,000, etc. Conversion costs will range all over the lot depending on the number of programs to be written, the extent of systems research required, the size of the computer system. But, costs of $100,000, $200,000 and $300,000 are not unusual!

Elements of costs

What are some of the elements of conversion costs? Here are a few: site preparation, programming costs, rental cost of equipment temporarily retained after installation of computer, rental cost of computer during initial period following installation.

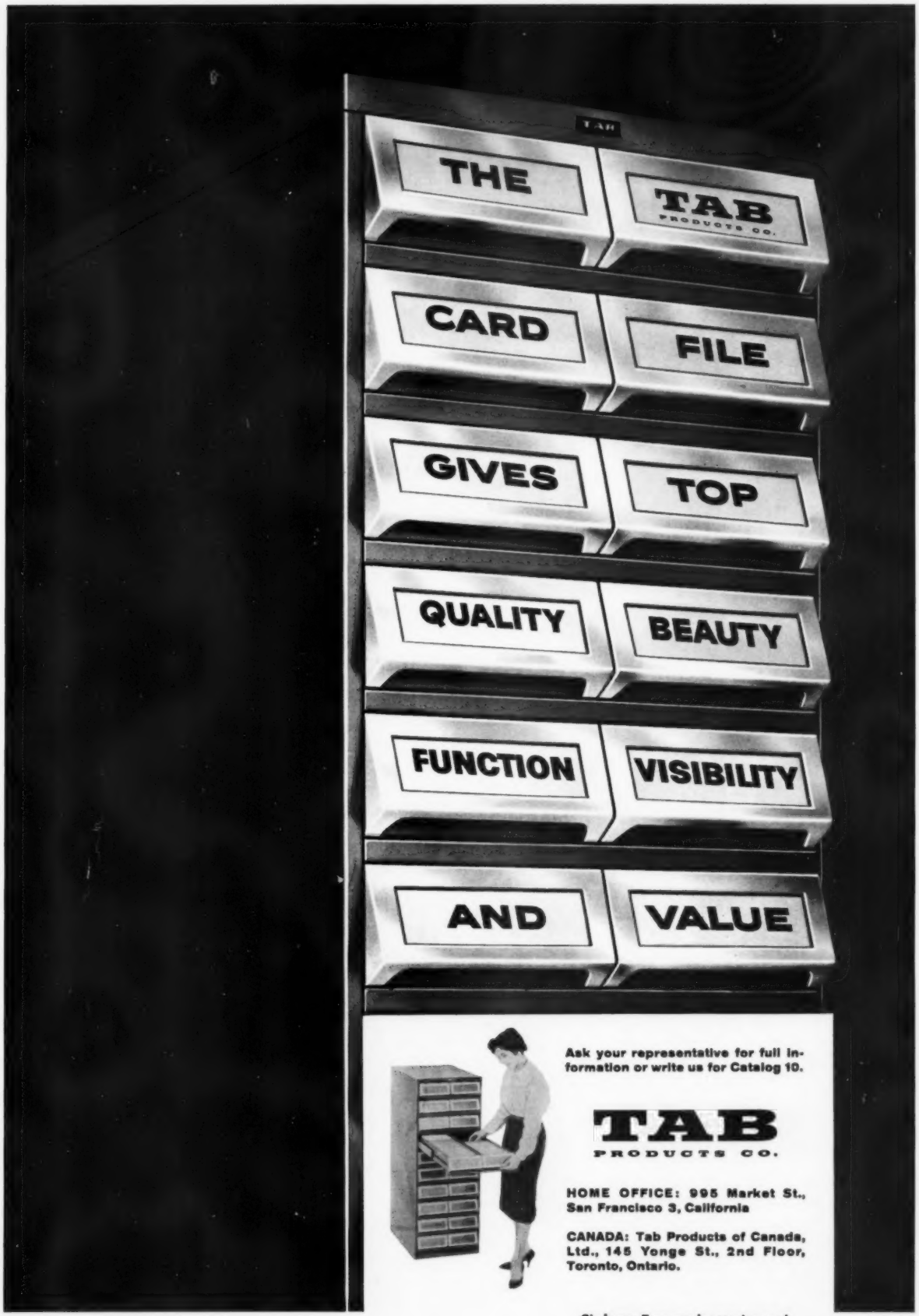
Site preparation for a tape system involves air conditioning and humidity control, floating floor, soundproofed ceiling, partitions, ramps, electrical circuits, and more. Programming costs include systems analysis, coding and debugging and involves many man-years of effort. Programming is normally the biggest single factor in conversion costs.

After installation of the computer there will be an indeterminate period during which debugging will be done, parallel runs may be made, some of the applications will go on the new equipment while others will continue on the old equipment for the shakedown period. Well, during this phase you incur two other costs of conversion. One is the rental cost of the tabulating equipment and the old computer which will eventually be released but must be retained for the shakedown period. The other is the rental cost of the new computer for the period from date of installation when rental starts to the date that the computer is fully "on the air" with anticipated savings realized and a profit showing. It is not surprising for this period to take at least 6 to 12 months. Try estimating these costs for your project, then add a safety factor of say 20%, and perhaps an allowance for consultant fees. If you haven't done it before, you may be surprised at the result.

Whether your feasibility study is very casual or very sophisticated, be sure you pick up and evaluate the intangible benefits which are present. Consider the tangible factors, especially the economic benefits. Determine the annual savings expected, the magnitude of the conversion costs and the number of years before breakeven is reached.

Such information, properly appraised, will allow you to take your electronic steps with confidence.

■ ■ ■



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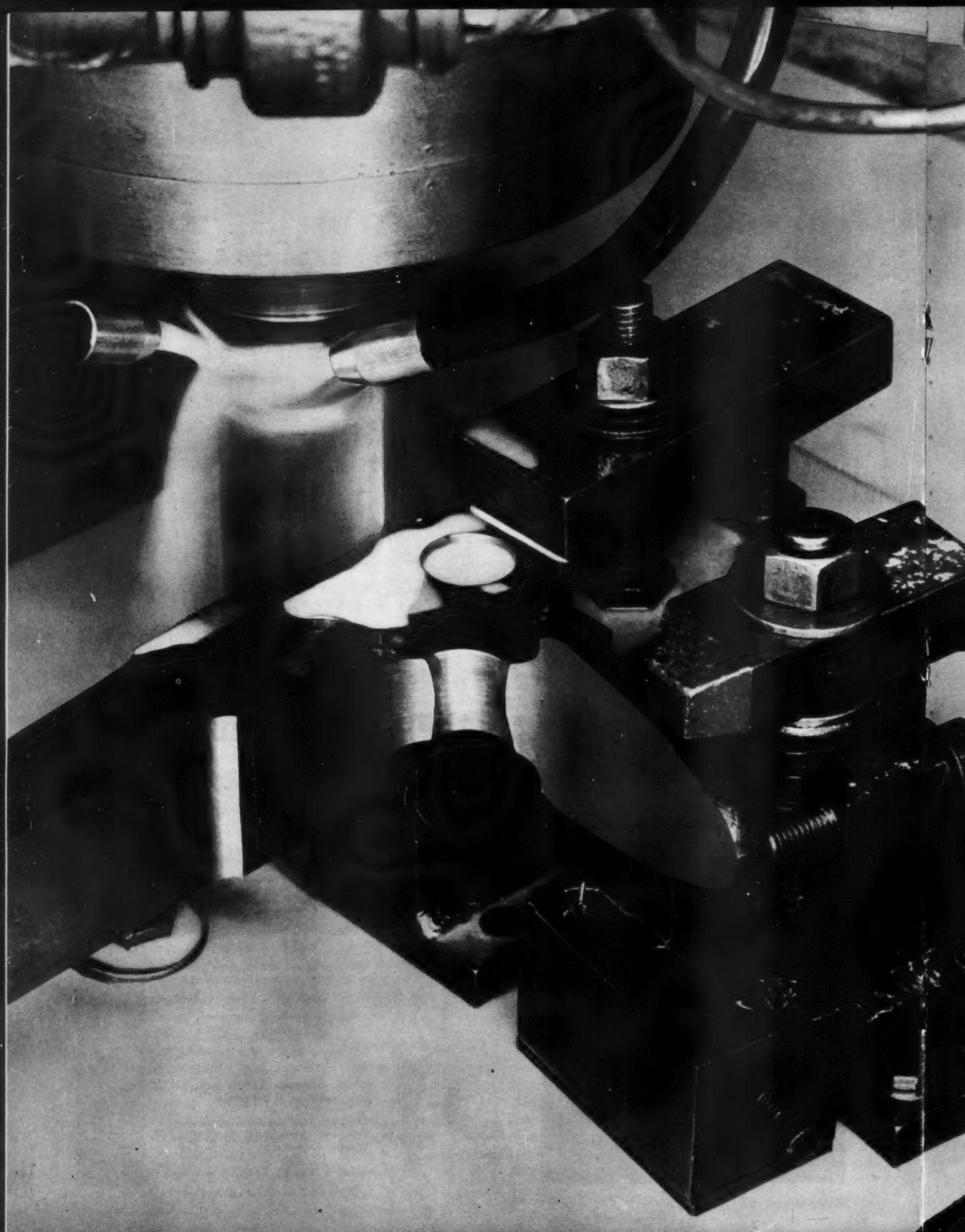

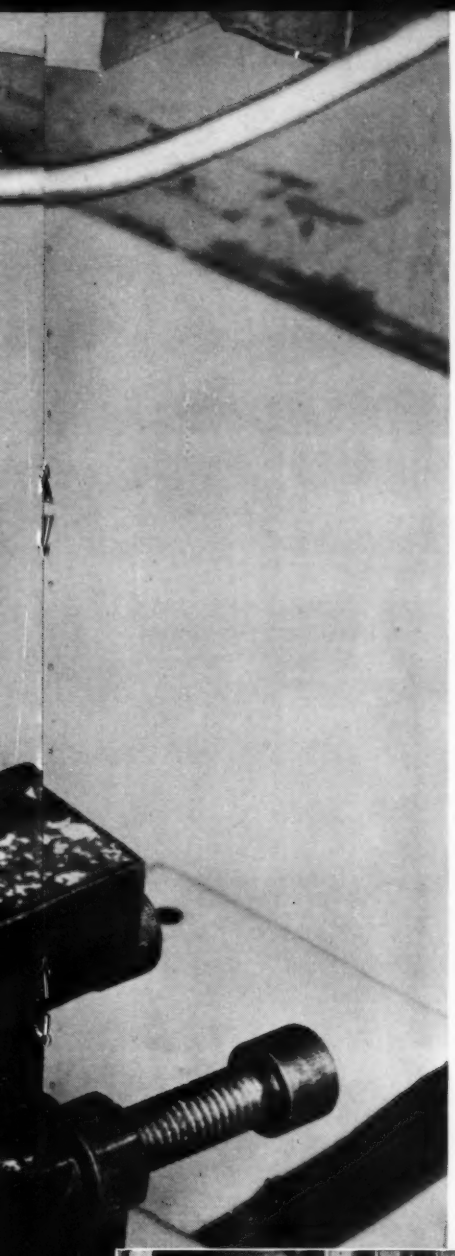

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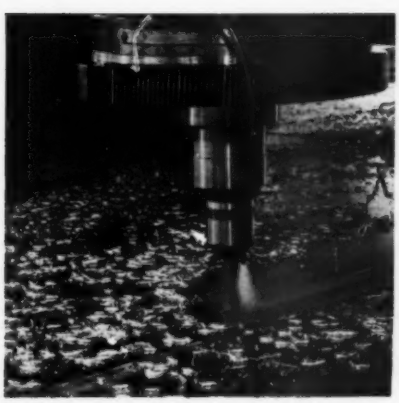

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National Electronics Conference

By Edith Harwith Goodman

MEETING at the Detroit Statler-Hilton in September, the Mortgage Bankers Association turned out between 600-700 members for the National Electronics Conference. The full four-day program was designed to cover the needs of every member, whether currently using electronic equipment or not.

The programs were minutely planned, and the schedule was tight. There were exhibits by 18 manufacturers.

Seminars were concurrently scheduled for prospective and present users of equipment. Each seminar was repeated twice daily for three days, giving conferees the opportunity to attend everything on their side of the program.

Current users

For the current users the program covered: mortgage loan accounting — on a Univac Solid State 90, IBM 1401 and IBM 650 Tape Ramac — with field trips to First Federal Savings of Detroit, Citizens Mortgage Corporation, and Manufacturers National Bank, respective users of the equipment. Other seminars covered construction loans and loans in process, escrow analysis and annual reports, statistical reports and research programs. Also, general ledger and corporate accounting, branch office operations and communications divided into centralized accounting systems, microwave and leased wire installations, branch-home office liaison, branch offices costs and budgetary control.

Seminars for prospective users

Prospective users attended seminars where actual equipment demonstrations were given by Burroughs, National Cash Register, IBM and Remington Rand. Subjects covered were mortgage loan accounting on various equipment; conversion — when, selection of proper equipment, preparation, and problems during conversion; service bureaus and joint installations — including advantages and disadvantages of each, when to use a service bureau, how to share electronic equipment, and selling excess time on one's own equipment; general ledger; payroll; construction loans and loans in process; escrow analysis and annual reports; statistical reports and research; and the newest equipment and techniques.

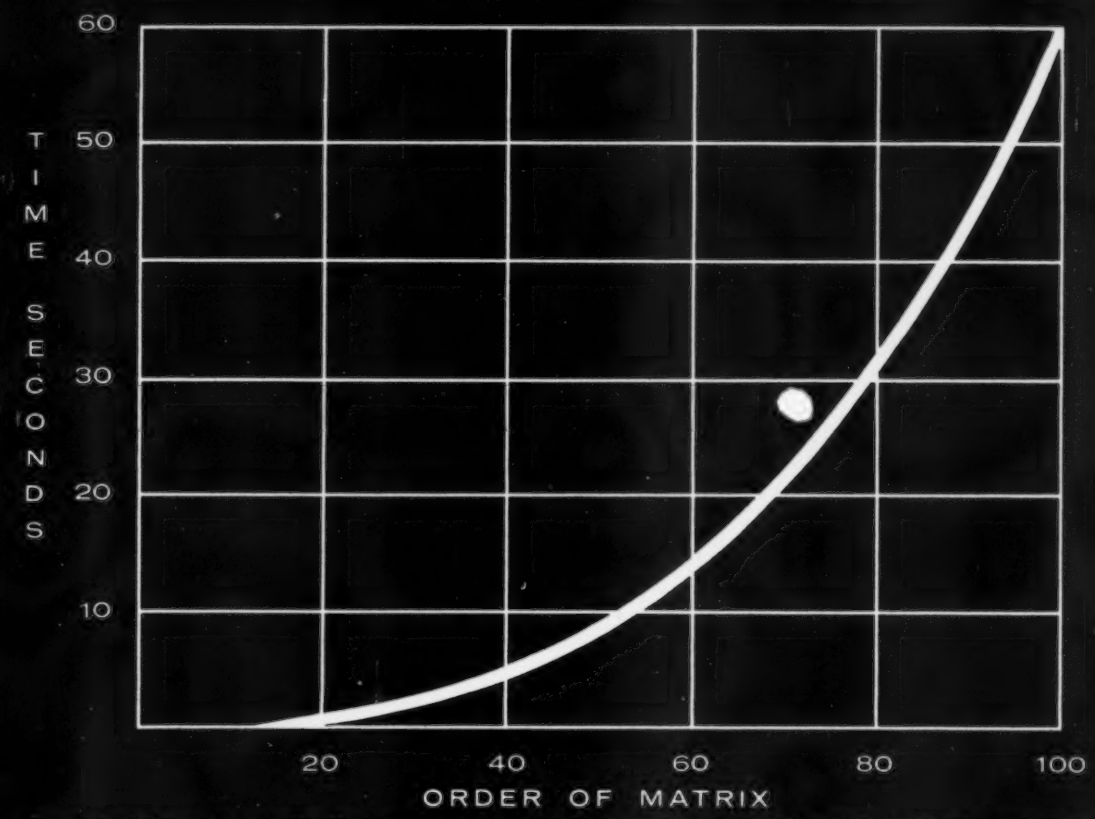
The final session for the current users was a "cloud nine" approach to a projection of what might happen by 1970. After running through optical scanners replacing card input, remote input-output to computer systems, how to handle the withholding of dividends and interest taxes at source, causing an increase in volume of work, the discussion went into orbit speculating about satellites for transmission, microwave replacing transceivers, and use of a system (such as used for airline reservations) for a possible centralized report clearinghouse.

Money — what's that?

Resting firmly on a pink cloud, in spite of the efforts of everyone else to send him into orbit as communications satellite, co-chairman Edward De Young brushed aside the getting-to-that-point by projecting the time when there will be no checks, payment coupons, and almost no currency. Expanding on an already apparent trend, he visualized the day when no one would be paid by check but by a credit issued by employer to bank; nor would bills be paid by check. Rather, the customer would authorize the bank to honor his bills as they came in. This would necessitate only telling employer and creditors what bank one does business with and letting them take it from there. All mortgage, as well as other bills, would be paid. Creditors would have no uncollected bills — banks would automatically put a loan into an account if it ran a little short and collect in the next pay or two, at interest of course.

Co-chairmen of the event were William W. Dwire, vice president of Citizens Mortgage Corporation, and Edward J. DeYoung, vice president and controller of First Federal Savings of Detroit.

Fast Matrix Inversion



Times indicated were obtained with a 10 microsecond memory. Much faster operations are possible with Philco's new 2 microsecond memory.

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Matrix inversion provides a good measure of computer speed for scientific applications. The time a computer requires to solve problems of this type is significant because they occur in so many different applications and because of the magnitude of the computations involved. For example, to invert a matrix of order 100 involves 1 million multiplications and 1 million additions.

Philco 2000 Electronic Data Processing Systems can perform matrix inversion in the times shown in the chart because of their extremely fast arithmetic speeds; "repeat" instruction, which eliminates "housekeeping" in the inner loop; variety of instructions (59 floating point commands); and numerous index registers. What's more, because of the 48-bit word length, the matrix inversion sub-routine provides high precision and occupies only 109 words of memory!

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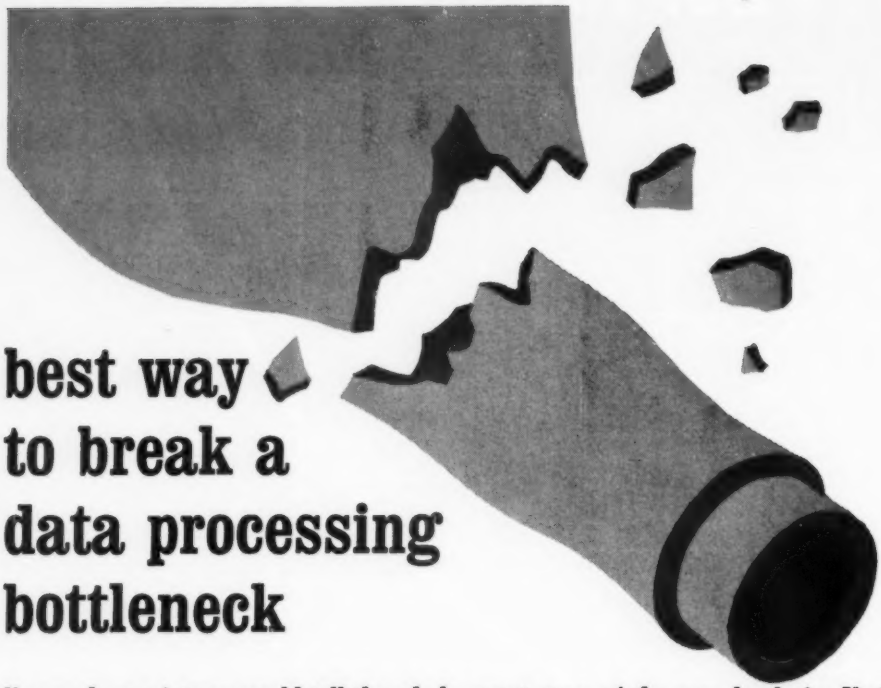

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By John H. DeJong

Computers in Great Britain

SECOND ONLY TO THE UNITED STATES in computer manufacture and use, Great Britain has gone far in the data processing field. Right now there are well over three hundred computer installations in the country, and all but a very few of these are products of Britain's computer industry.

In the British Isles there is no one manufacturer who can be considered king of the computer hill. The logical contender for the top spot is International Computers and Tabulators, the company which has controlled the punched card market and still has over 80 percent of all data processing installations; but ICT has been unable to come up with a high-scale computer, and its newly announced solid state system has a two-year delivery lag. Actually none of the manufacturers has kept up with the recent advances in American computers, and as a result, United States competitors may become more fashionable in the next year or two; 80 IBM 1401 systems are scheduled for installation in the next year, and Remington Rand recently made its first British sale, indicating the progress of American products in the market.

The manufacturers

There are eight British companies which make computers: Associated Electrical Industries, Elliott Brothers, E.M.I. Electronics, English Electric Company, Ferranti, ICT, Leo Computers, and Standard Telephones and Cables. Peripheral-equipment producers include: Associated Automation, B. U. Supplies and Machinery, Creed and Company, Rank Precision Industries, and Solartron. This group enjoys a position in Great Britain very much *unlike* its counterpart in the United States; computer users are given a choice of several types of printers, readers, punches, and tape units, made by a variety of producers, yet easily compatible with their computers. One type high-speed magnetic tape unit, for example, is being used on the computers of five of the eight manufacturers, even though each of these five companies has its own tape drives.

Early computers

The world's first operational stored-program electronic digital computer, EDSAC, was completed at Cambridge University in June 1949. Shortly after its completion, Leo Computers copied much of EDSAC into Leo I and started building for commercial use; the first one was completed in 1951, but for some reason, this first Leo I was the only one installed.

For the next several years, computer activity was limited for the most part to the universities of Britain; they designed components, built their own hardware, and ran the computers. As was the case in the United States in the early fifties, the university computers were used both for academic research and on commercial problems. During these years, less emphasis was placed upon the design of the equipment than on how the equipment was being used. As a result of this emphasis, many of the sophisticated numerical techniques used in digital computing were developed by the British universities. Even today, there is more concern in Britain over the use of computers than on their design.

The "first generation" of commercial computers were largely copies of the machines built by the universities. The Elliott 402E, the English Electric Deuce Mk I, and the ICT 1200 were the forerunners, all with installations in 1955. During the

next two years, Ferranti brought out the Pegasus I, AEI the Metrovich 950, and ICT the 1201. Each of these used a magnetic drum as the main memory with some recirculating high-speed memory in addition.

The first magnetic core machines were the Leo II and Ferranti's Mercury. These 1957 machines are roughly comparable to the IBM 704 and 705 and the Univac II and 1102.

The new generation

Seven of the eight computer companies in Great Britain have at least announced new machines, in most respects similar to the new American computers. In this class are the AEI 1010, the English Electric KDP-10 and KDF-9, the Elliott 503, both EMI's Emidec models, the ICT 1301, the Leo III, and the Ferranti Orion and Atlas. Some of these are almost carbon copies of American computers—the KDP-10 is a modified RCA 501—while others use entirely new concepts.

A particularly interesting computer is the KDF-9; it can handle up to four programs concurrently with demand-interrupt features allowing time-sharing to take place; a permanent supervisory program controls the time-shared operations and prevents one program from interfering with another. A unique register configuration, the "nesting store," speeds arithmetic operations (add time is one microsecond) and reduces the number of program instructions needed to perform an extended calculating sequence. Data enters and leaves the nesting store via the top register. When a word is placed in this register by the program, the items held in lower registers are moved down one place; when a word is taken from the top of the string, all others are moved up. Arithmetic and logical operations are performed on the "Polish strings" in the nested store, much as the Burroughs B5000 executes its programs.

The most powerful computer offered by the British is Ferranti's Atlas, a copy of a machine designed at Manchester University. In addition to a main memory of 16,384 words of core storage, there is a "fast memory" of 8,192 words with a 0.15 microsecond access time; this special memory consists of wire meshes and small ferrite rods. The Atlas can perform floating-point addition in 1.1 microseconds and multiplication in 4 microseconds.

■ ■ ■

Manufacturer	System	First Date Delivery	Quantity Delivered	Storage	Char./sec. Tape	Lines/min. Print	Cards/min. Read	Cards/min. Punch
ASSOCIATED ELECTRICAL INDUSTRIES	1010	61	1	Core: 4,096 words Drum: Up to 32,768 words	45,000	3,000	400	100
ENGLISH ELECTRIC	DEUCE MK I	55	21	Mercury Delay: 402 words Drum: 8,192 words	—	—	200	100
	DEUCE MK II and MK IIA	58	8	Mercury Delay: 626 words Drum: 8,192 words	10,000	—	200	100
	KDP-10	62		Core: 200,000 digits	33,333	900	400	150
	KDF-9	62		Core: Blocks of 4,096 words	33,333	900	400	150
ELLIOTT BROTHERS	802	58	2	Core: 1,024 words	—	—	—	—
	803	59	6	Core: 4,096 words	—	600	400	100
	402E and 402F	55	8	Drum: 4,976 words	—	—	—	—
E.M.I. ELECTRONICS	EMIDEC 1100	60	9	Core: 1,024 words Drum: Up to 65,536 words	45,000	300	400	100
	EMIDEC 2400	61	1	Core: 4,096 words	60,000	3,000	400	—
INTERNATIONAL COMPUTERS AND TABULATORS	1200	55	6					
	1201	56	33	Drum: 1,024 words	—	—	—	—
	1202	59	11	Drum: 4,096 words	—	100	200	100
	1301	62		Core: 2,000 words Drum: Up to 96,000 words	45,000	600	600	100
ELLIOTT	503	62		Core: 4,096 or 8,192 words	45,000	—	400	100
LEO COMPUTERS	LEO II	57	11	Core: 2,048 to 16,384 words	10,000	—	200	100
	LEO III	62		Core: Up to 32,768 words	90,000	880	600	100
FERRANTI	MERCURY	57	14	Core: 1,024 words	10,000	150	200	100
	ORION	61		Core: 16,384 words	75,000	3,000	600	100
	PEGASUS I	56	21	Drum: 5,120 words	—	—	—	—
	PEGASUS II	59	5	Drum: 9,088 words	10,000	—	200	100
	SIRUS	60	3	Nickel Delay: 1,000 to 10,000 words	—	—	150	120
	PERSEUS	59	1	Nickel Delay: 1,024 words	9,000	300	300	—
	ATLAS	62		Core: 16,384 words Wire Mesh: 8,192 words	90,000	3,000	600	—
STANDARD TEL. AND CABLES	ZEBRA	57	15	Drum: 8,192 words	48,000	—	—	—

Mr. President:

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It could save your company thousands of dollars!

Two years ago it could have saved the U. S. Government several *million!*

On July 2, 1959, the destruction of some of the Pentagon's electronic data processing equipment and records resulted in enough extra expense (aside from the physical loss itself) to have wiped out even a strongly financed private business concern.

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This new protection—The St. Paul Data Processing Policy—protects your company as no other single policy or plan does. It is, in fact, the one and *only* policy that can and *does* give you the protection you need with these three optional coverages: (1) Pays for extra expenses resulting from destruction or damage to any part of your data processing system whether caused by fire, flood, wind, collapse, theft, water damage or any of many other unusual perils. (2) Pays for costs of reassembly and reproduction of damaged or destroyed records and/or tapes. (3) Pays for repair and/or replacement of damaged or destroyed data processing equipment.

Now, if you lease your equipment, you may think you are covered by the lessor. And, as far as the equipment or certain components are concerned, it is possible that you are for some conventional perils. But perhaps only partially; and perhaps not at all. (And certainly not for *extra expense*, which may even exceed the cost of the equipment itself.)

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partial contents

VOLUME I ELECTROMECHANICAL EQUIPMENT

GENERAL

A history of punched card and associated data processing equipment.

An introduction to punched card data processing.

Illustrations of more than 200 pieces of equipment, a detailed description and specifications of each. The machines are grouped by function, for example, all sorters form a section of the volume (see list below).

Each section of the volume is followed by a comparison chart which lists the cost and monthly rental of each machine.

A complete index of the names and addresses of the manufacturers follows the section on machines and comparison charts.

There is a glossary of terms used in the punched card field.

An index to the contents of the entire volume completes the encyclopedia.

Equipment and Systems.

Accounting Machines (*Tabulators*)
Addressing Machines
Bursters
Burster-Imprinters
Calculators
Carbon Separators
Cardatype Machines
Card Conditioners
Card Controlled Tape Punches
Card Form Die-Cutters
Card to Tape Punches
Collators
Computing Typewriters
Decollators
Facsimile Posting Machines
Flexowriters
Form Folders
Interpreters
Key Punches
Print-Punch Marking Machines
Proof Inscribers
Proof Machines
Reproducers
Sales Recorders
Sorters
Statistical Machines
Summary Punches
Tag and Label Imprinting Machines
Tag Readers
Tape to Card Punches
Tape Controlled Card Punches
Tape Punching Adding Machines
Tape Punching Bookkeeping Machines
Tape Readers
Tape Reading Address Plate Embossers
Tape Transmitters
Teleprinters
Test Scoring Machines
Thermobinders
Ticket Converters
Time-Punches
Transceivers
Typewriter Card Punches
Verifiers
and others

VOLUME II ELECTRONIC EQUIPMENT

GENERAL

An introduction to electronic data processing equipment.

Illustrations of more than eighty electronic computers or computer systems, a detailed description of each, the components of the system, input and output media, auxiliary components, programming details, power requirements and physical characteristics; also magnetic ink character recognition and optical scanning devices and equipment (see list below).

ADEC
Harvard University
ALWAC III-E
El-Tronics, Inc.
AVIDAC
Argonne National Laboratory
Bendix D 12, G 15, G 20
BIZMAC
Radio Corp. of America
Burroughs 205, 220, B251, VRC, E 101
Clary DE 60
CDC 1604, 160
Control Data Corporation
Datamatic 1000
Minneapolis-Honeywell
DEC PDP-1, PDP-3
Digital Equipment Corporation
DIANA
Laboratory for Electronics
DYSEAC
National Bureau of Standards
EDVAC
Moore School of Elec. Engineering
GE 210, 225
General Electric
GEORGE
Argonne National Laboratory
Honeywell H-400, 800
Minneapolis-Honeywell
IBM 305, 650, 704, 705-1, 705-2, 705-3, 709, 1401, 1620, 7070, 7074, 7080, 7090
ILLIAC
University of Illinois
LARC
Remington Rand
LGP 30
Royal McBee Corporation
MANIAC
University of California
Monrobot XI
Monroe Calculating Machine Co.
NAREC
Naval Research Laboratory
NCR 304, 310, 315, 390
National Cash Register Co.
NORC
IBM
ORACLE
Oakridge National Laboratory
Argonne National Laboratory
Packard-Bell PG-250
QUAC
Northrup Aircraft
RAYDAC
Raytheon
RCA 301, 501, 601
Radio Corp. of America
RECOMP II
North American Aviation Co.
RPC 4000, 9000
Royal McBee Corporation
SEAC
National Bureau of Standards
STRETCH
IBM
TRANSAC S 2000
Philco Corporation
Underwood
UNIVAC File Computer (UFC-1);
Univac Solid State 80, 90,
Univac II, III, 1103A, 1105
Remington Rand

and others

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It can help you save thousands of dollars that might be wasted due to an otherwise inaccurate survey. It can be even more valuable by helping you vastly improve the efficiency and effectiveness of your data processing functions.

By George A. Ford

Staffing for Conversion

CL & P puts computer system "on air" in half the predicted time

SELECTION OF PROGRAMMERS who know the utility business enabled the Connecticut Light & Power Company to get a new large-scale computer system "on the air" in one-half the time predicted.

When we announced plans a few years back for installation of an electronic computer system to handle our customer accounting operations, most data processing experts agreed that the programming job would amount to about 40 man-years of total effort. A similar system at another large utility, in fact, had required just that amount of time.

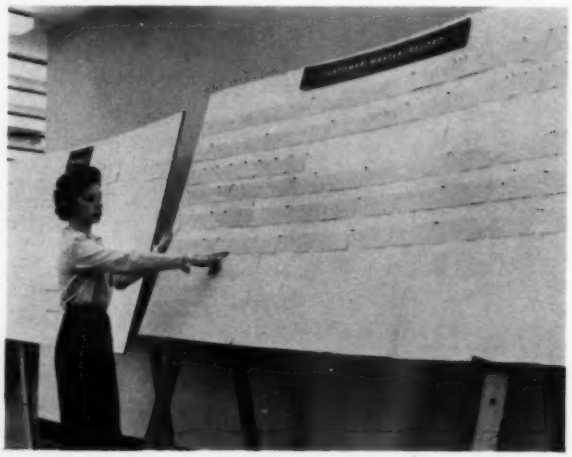
But we were able to complete the mammoth programming job in just 19½ man-years — a year and a half of team effort. The secret behind this impressive reduction, however, is no secret at all: we culled our programming staff from personnel working for the company. These people already had an intimate knowledge of utility company operations and problems. They were trained in programming and IBM machine operation techniques. The result was benefits for the company in putting the computers to work much sooner than anticipated — plus gains to the employees through upgrading of their jobs.

Today an IBM 7070, with peripheral 1401 systems, is speeding service bills to 412,000 CL&P power customers and handling the complex accounting chores of the company. The programs written for these machines ensure rapid and accurate processing. Moreover, the programs and the equipment have enough flexibility to take on customer increases for the next ten years, even though CL&P expects to double its accounts by 1970.

While many factors were involved in achieving these results, principal credit must go to management and the programming staff. Plans were formulated well in advance of the system. All company personnel were given the opportunity of applying for the programming positions. Tests, evalu-

Through some unique programming technique, the Connecticut Light & Power Company has been able to put a high-powered computer system to work in one-half the time anticipated. Here a group of programmers work out a new routine.

During programming, details of data processing operations were worked out on display boards. Here, a programmer shows the Customer Master Record, comprising an average of 600 characters of data for one account. In practice, all this information is recorded on a few inches of magnetic tape.



ations and screenings were thorough and impartial. Training was comprehensive and intensive and actual programming work reflected a high degree of team effort. Results were commensurate with the work put in previously.

L. E. Reynolds, vice president and treasurer of CL&P, set up the ground rules for the conversion several years ago when it became evident that electronic data processing was the only solution to the company's growing paperwork problems. Long an advocate of clerical reduction through business machines, Mr. Reynolds gave the green light for the present system.

Prior to 1924, the general method of billing in utility companies was by loose-leaf ledger. Bills were calculated by hand, posted to the customer's ledger and transferred to a postcard bill. Everything was done manually at the local branch offices.

Then CL&P became the first company in the country to adopt a new type of mechanized bookkeeping — the so-called stub accounting system. This was followed by a mechanization and centralization of billing addressing procedures at CL&P's old Waterbury headquarters.

In 1936 the company made the then dramatic move into punched card billing equipment and in 1948 adopted the more advanced alphabetic-numeric billing system. This system was discontinued in 1951 when IBM electronic calculators were installed to compute all electric and gas service bills. As a prelude to the present IBM 7070/1401 system, CL&P in 1956 moved into mark sense meter reading techniques to minimize manual effort. In 1957, a committee under the direction of the writer, undertook the study of electronic data processing.

(continued on next page)

All documents which might be produced by the IBM 7070/1401 system for a single customer account are shown here, including statement, past due notice, reminder, etc. All of these documents, as needed, are produced automatically by the system.

Circle no. 12 on reader service card.

Choosing staff

At this point the company made the important decision to look for its programming staff right at home. We talked to almost 500 employees carefully outlining the importance of the job and explaining what programming duties would entail. As a result, some 167 people volunteered for testing.

The aptitude tests — scientifically prepared to uncover the special abilities needed for programming work — were provided and supervised by IBM. Of the employees who took the examinations, nine received "A" grades and 22 got "B's". Of this group all the "A's" and the top 13 "B's" were sent to programming school. The courses required three weeks and were conducted right at the Hartford IBM branch office.

It is important to stress that no employee, at any time, was penalized in any way for failing to meet the grade as a programmer. This was emphasized to the men and women from the very beginning. In fact, the selection process was conducted entirely by the data processing department — and did not go through personnel at all. Thus, failure to meet programming requirements did not — and does not — appear on anybody's personnel record.

At the end of the schooling period, the group was given a small bill calculation and file maintenance program to write. This actual work screened out six more people who returned to their previous jobs within the company. During the final interview one more was eliminated, two decided to return to their former work, leaving a team of 13. These people then went to work on the actual programs for the IBM 7070/1401 system.

The final group of 13 is still on the job, writing and supervising the programs and running the machines. The programmers operated the machines during the conversion period, meanwhile training other company personnel to take over these tasks. We find that this technique facilitates supervision of programming effort and increases familiarity with the equipment.

Backgrounds varied

The present group of programmers reflects a wide range of educational background and experience. There are seven high school graduates and six college graduates. The college people include an economist, two electrical engineers, a copywriter who majored in English, an accountant, and only one man — who majored in history — with previous systems experience.

The high school graduates came from many departments, including general machine accounting, collections, distribution, and other jobs. Most, however, were associated in some manner with accounting chores.

As to salary, the entire group went in at their previous rate — and with no firm promise of increase. However, they were assured that seniority rights and credit within their old departments would be maintained while they were "trying out" for the programming team. Also, incremental raises due them in old departments would be given during this period.

Once the final team had been selected, old department rights were eliminated. The 13 programmers were given salary increases commensurate with their new positions — with those earning lower rates getting a greater increase to bring them closer to the top earners. With some of the group coming out of higher salaried engineering and professional positions, and others having been clerks and machine operators, some equalizing was necessary.

Programming work went on long before the actual machine was installed. Programs were tested extensively on the 7070 at the IBM Datacenter in New York. The CL&P computers went in on December 17 — and were actually "on the air" by February 1st. Accounts were cut-over on a scheduled basis and conversion completed as scheduled by July 1, 1961.

The actual processing run is a prime illustration of why our programmer selection technique is so successful. Although the 7070 has a 10,000-word memory capacity — ample under most conditions — we have been able to handle both file maintenance and bill calculation in just one machine pass using *20,000 words of memory.*

Here's how the programmers accomplished this:

First, they stored 6,000 words of instructions in the 7070's internal memory leaving 4,000 positions for processing operation. Second, they recorded another 5,000 instruction words on magnetic tape and instructed the computer to use these as needed. Finally, on one of the input data tapes, they arranged for 5,000 words of instructions to be integrated with the data, so that as the information enters the 7070, it is accompanied by the processing instructions. Thus, the effective memory capacity was increased by a total of 10,000 words.

All of this shows how knowledge of utility operations, coupled with programmed aptitude, has helped us gain the maximum from our system. Utilizing a basic Autocoder language to prepare program steps, along with an input-output control system package program provided by IBM, our programmers have been able to save considerable time and work in every phase of operations. With the satellite 1401 computer systems editing the raw data and printing from the final tapes, and the 7070 doing the actual processing, we have one of the most advanced systems in the industry and the result has been benefits to both the company and its many customers. ■

SUBTRACT QUANTITY-SOLD FROM BALANCE-ON-HAND. IF BALANCE-ON-HAND IS NOT LESS THAN REORDER-LEVEL THEN GO TO BALANCE-OK ELSE COMPUTE QUANTITY-TO-BUY = TOTAL-SALES-3-MOS/3.

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```
06000 ?  12048 12047      06096 '  12042
06011 '  12040            06102 ?  12017 12046
06017 ?  12007 12043      06113 @  12013 12047
06028 @  12002 12047      06124 H  12042
06039 C  12047 12049      06130 ?  12047 12022
06050 J  06068 U          06141 '  12043
06057 A  12050 12046      06147 ?  12012 12047
06068 H  12040            06158 S  12022 12047
06074 ?  12046 12012      06169 H  12043
06085 ?  12048 12047      06175 ?  12047 12027
```

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IBM
DATA PROCESSING

Pick a Path with Port-A-Punch

A convenient tool in origin and destination studies

THE PORT-A-PUNCH, an I B M device, enables on-the-spot punching of data which can later be processed in a data processing installation. It consists of a punching board, a punching instrument (similar to a mechanical pencil) and special cards which are prescored for each punching position. The cards are standard sized 80 column cards containing 40 prescored columns of 12 punching positions each. The 40 columns correspond to the even numbered columns on the standard 80 column cards. The cards are inserted in the punching board and the punching instrument is used to remove the prescored chips.

The principal reason for our experimenting with the port-a-punch in New York State was to obtain finished data faster than with previous methods and more economically, if possible. In today's traffic little delay can be tolerated and we were looking for a faster method of interviewing than the conventional method. Thus, we tried out the port-a-punch device in our origin and destination surveys for the cities of Yonkers and Canandaigua and the village of Brewster.

The cards were set up so that hourly volumes of about 600 vehicles per lane could be handled with a 90 percent or better interview sample. We thought this was possible because all of the O & D information could be recorded in as few as five punches on the card. Under these conditions, vehicles could be stopped in the travel lane for not over ten seconds. As a matter of fact, many of the locations in Yonkers were on single-lane curbed parkway ramps. At those locations, there was no alternative than to interview traffic in the travel lane.

Application setup

We set up the Yonkers cards with 12 pre-coded origins and destinations, three within the city and nine outside. The places within the city were Otis Elevator, the city's only major factory; Getty Square, the downtown central business, shopping, and city government area; and the Cross-County Shopping Center, one of the largest of its kind in the state. The nine pre-coded places outside the city were names of cities and villages nearby. Both Brewster and Canandaigua had 24 pre-coded origins and destinations. These pre-coded places could be punched as either origin or destination but interviewers were cautioned that a single place should not be punched as both. The coding for vehicle type and trip purpose was memorized for Yonkers by the interviewer but abbreviations for those items were printed directly on the cards for the subsequent O & D studies in Brewster and Canandaigua. We found that the pre-coded origins and destinations (port-a-punch cards) for the 154 survey sites in Yonkers accounted for 31 percent of all the interview information. It appears that the statistics for the Brewster and Canandaigua surveys will show about the same proportion of information documented by the port-a-punch sys-

By Joseph F. Reilly

tem. It must be considered that conditions imposed by the Yonkers survey required exact addresses for all trips terminating either in Yonkers, Mt. Vernon or the five boroughs of New York City. New Jersey and the counties of Westchester, Rockland and Nassau were divided into zones, so that named places were required for trips terminating in those areas.

Thus, with the above limitations, it is of interest to note that the port-a-punch cards accounted for such a sizable percentage of the total trips. The Canandaigua survey was similar to Yonkers in that all trips terminating within the city were required to be pin-pointed by exact addresses. The Brewster survey had no street address areas.

Color stripe cards

The cards for Yonkers were ordered with a colored stripe throughout the length of the card with the stripe position indicating hour and the color indicating A.M. or P.M. These cards were gang-punched with station, direction, and hour identification in estimated quantities for each site as determined by one-day machine counts. This preparation involved a considerable amount of hand work, traffic counter machine and machine work, but this work was still less than for previous interview surveys. We could not estimate card needs by hour for Brewster so the color stripes were used to denote A.M. and P.M. only. Canandaigua cards were not color striped or identified prior to field use at all.

Our observations on the color stripes and pre-punching for interpretation are as follows:

1. *Liberal estimates should be made for the number of pre-punched cards needed by hour at each site.* In Yonkers, blank cards were used to fill out when pre-punched cards were exhausted because of greater than anticipated interview rate. These cards had no identification and had to be handled carefully to avoid errors. On the normal cards, the pre-punched and interpreted data was intended to keep them in proper order for machine processing. However, after coding and editing, practically every hour had a number of "extra" cards that had to be machine punched for proper identification. In the Canandaigua survey, a number of blank "extra" cards were gang-punched with the interview cards after the field work was completed. The identification was done both before and after in Yonkers and only after in Brewster and Canandaigua.

2. *In Brewster, color stripes were used to separate A.M. and P.M. hours.* There were only eight sites for Brewster so no pre-punching was done for that survey. Under these conditions, the color stripes served as an excellent way to keep hours in order. However, it is planned to use color stripes in addition to different background card color to separate directions on future two-way interview areas.

From experience with the above variations, it appears that:

1. Inbound and outbound cards should have different background colors.
2. Inbound and outbound cards should have different make-up regarding pre-coded information so as to better utilize geographical features.
3. Color stripes should be used to designate hours.
4. The cards should be pre-punched and interpreted with identification.
5. The "spare" or "extra" cards should be identified by field punching.

Field experience

The field work for all three surveys was similar. Roadblocks at the survey sites were set up and nearly every vehicle was interviewed. The pre-punched cards were stored in the original cardboard boxes supplied (approximately 2,000 per box), by sites. Morning-shift cards were separated from afternoon-shift cards as interviewers operated from 7:00 A.M. to 2:00 P.M. and 2:00 P.M. to 9:00 P.M. A panel station wagon was used as an office and supply truck. Morning-shift crew chiefs were contacted at the end of shift, collecting cards used and supplying cards to begin operation the following morning. The same procedure was used with afternoon crew chiefs. Each weekend (Friday night concluded week) the completed cards were taken to the main office for coding and editing. Some 250,000 Yonkers cards were handled.

If both origin and destination were on the card as pre-coded places, interviews were finished in less than ten seconds. If both origin and destination were write-ins, the interview took up to 30 seconds. The pre-coding speeded up interviewing on an average of two and a half times over the 100 percent write-in method. This speed-up enabled the interviewers to obtain a 90 percent sample or better of trips without seriously affecting traffic. The interviewers were local people hired for the purpose and paid on an hourly basis. They were given six hours classroom instruction before field operations were begun. The Yonkers survey was scheduled to use 100 interviewers working 13 days. As the job progressed, a maximum of only 80 interviewers were obtained at any one time and the Brewster survey (being relatively close) was operated with the same people. Combined, the two surveys took approximately a month.

Canandaigua, being far removed from Yonkers,

was run on a single Thursday using six experienced main office employees as crew chiefs. Training was accomplished on the day prior to the survey, by setting up a site on a local highway and training "on the job." Five permanent people from our office took groups of ten interviewers and instructed them on an actual contact basis, operating for a period of four hours until all persons were thoroughly indoctrinated. This proved more effective over the method used in Yonkers which was principally "classroom instruction."

Some of our findings on the field work are:

1. Crew chiefs need to be trained prior to the interviewers.
2. Using the port-a-punch, traffic could be stopped in the travel lanes.
3. A minimum of police direction was required.
4. There were 168,327 codable trips produced in Yonkers. Of these, there were 55,767 pre-coded destinations — and 49,115 pre-coded origins representing 31 percent of the total trip terminations. (Comparable data for the Brewster and Canandaigua surveys was not available at this writing.)

Our coding was similar to previous studies, however, the coders punched the numeric information in the interview card rather than writing on the interview sheet. We found that there was little difference in coding production using port-a-punch or sheet methods because reading the generally poor penmanship and looking up appropriate codes for exact street addresses of origins and destinations took the major portion of the time.

Coding was finished, except for editing, about two months after the interviews were started.

In the coding of port-a-punch information, key punching is entirely eliminated. As to accuracy, we learned that machine editing as well as spot checking proved advantageous.

Machine work

By machine work, we obtained three sets of tabulations:

1. Origin to destination by station.
2. Station to destination.
3. Origin to destination for groups of stations (city line).

After hourly and twenty-four hour expansion factors were calculated and gang-punched, the port-a-punch cards were sorted on ten columns, that is, origin to destination by station. We also made a listing and summary cards from the original port-a-punch cards. This listing showed station, direction, card count, hourly expanded total and twenty-four hour expanded total for passenger vehicles, commercial vehicles and the sum of the two types. The summary cards were then used for the "station to destination" tables and "station group" tables.

The port-a-punch cards eliminated key punching which would have been a momentous "one shot" overload on the existing key punch staff. The port-a-punch cards were used in various punched card machines a number of times, that is, reproducer, interpreter, sorter-one pass, reproducer, sorter-twelve passes, and tabulator-one pass, without difficulty.

Conclusions

Our conclusions on use of port-a-punch for O & D surveys are:

1. The port-a-punch system enabled interviewers to produce more usable interviews faster with a minimum of traffic delays and motorist irritation.
2. The pre-coding reduced office coding by about 31 percent.
3. Key punching was entirely eliminated.
4. Intermediate paper work was eliminated.
5. Tabulated results were delivered to analysts within five months from start of survey.
6. It is anticipated that for future studies, the tabulated results can be obtained in five weeks or less after completion of field work.

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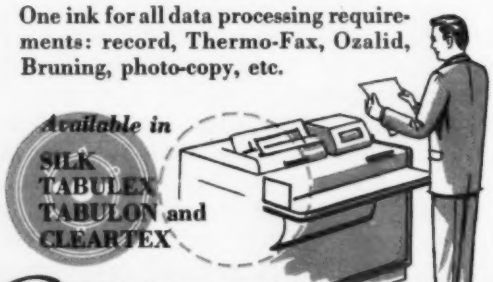

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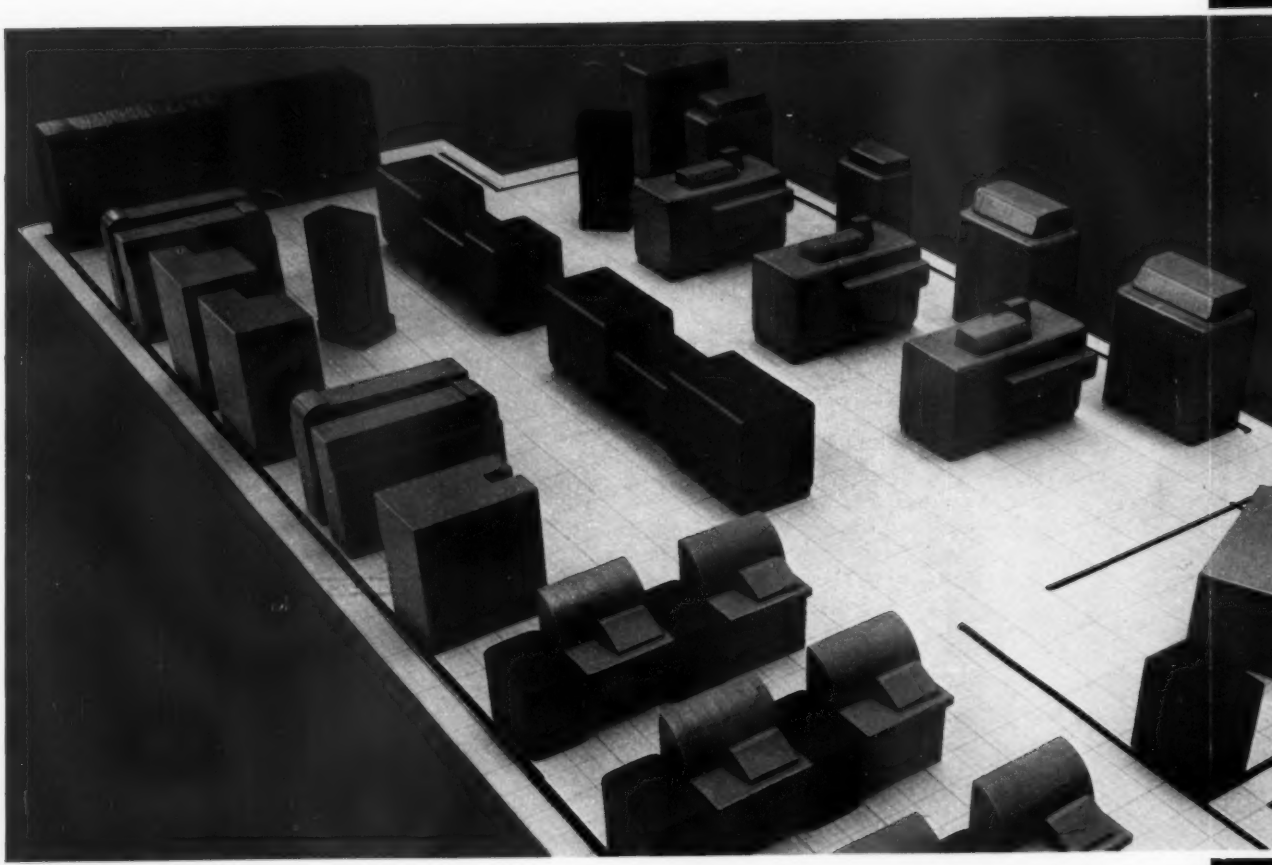

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By Max Joseph Havlick

What Does Data Processing Need Most Today?

WHAT MAKES "NEEDS?"

Some think of needs in terms of survival. They speak of the necessities of life — the things we need to stay alive. But these things are needs only because we all accept the idea that it's good to stay alive.

Until a purpose is set, there are no needs. Needs are the things it takes to fulfil the goals we set for ourselves. To discover the need, first know the purpose.

What is the purpose of data processing?

The purpose of data processing is exactly the same as the purpose of every other department in any company — to make money — to cause the total organization to make as large and as sound a profit as possible — with methods which contribute toward, and not against, the full, free growth of the human individual.

What does data processing need to obtain that worthy goal?

I think that the most pressing need today is for data processing people to give up their old defensive stance and come to a new, confident, inner awareness of the unmatched potential for profit improvement which exists in every single piece of punched card and computing equipment.

Let's understand this "defensive stance."

When punched card equipment first entered the business world, its operators were forced to defend the "invading machines" against all manner of suspicions and alarm. Punched card men had their hands full warding off flank attack — particularly the perennial suggestion that, after all, the machines "cost too much," and "why not get rid of those machines and go back to the good old manual methods we all understand."

Admitted or not, after twenty years of solid achievement, this feeling still prevails widely today.

And many data processing people are still not fully convinced in their own minds whether the flank attackers might not have a point.

Negative attitudes

We are not convinced, deep down, that modern data processing equipment is profitable for our company. It's something to be tolerated, but never enthusiastically promoted. We still grind out the same old reports, but when do we plan out and put across the mechanization of a new application? A few weeks ago my sales manager asked the punched card supervisor of a multi-million dollar company (with a magnetic tape computer on order) how much operations research they had. He answered with a puzzled look, "What's that?"

When a good job is recognized, isn't management and our own department happily relieved to find this new justification of the original acquisition?

How can management be confident and enthusiastic about data processing, when the people closest to it are constantly on the defensive, fighting for their survival, trying to justify their very existence, and lacking a basic, aggressive, confident pride in their own profession?

This defensive circle is a psychological reality and constitutes the greatest threat to progress in the field of data processing today.

It is time we developed a mature, balanced, confident acceptance of the unmistakable fact that data processing techniques have been so fantastically successful in the past twenty years that they are right now literally remaking the face of American business society in the most exciting social and economic revolution the world has ever seen.

Only then can the data processing profession stop eating the servant's crumbs, and start dining daily with the master of the house. ■

By Jackson W. Granholm

ACM Meets Nationally

Dr. Robert Rector, Space Technology Labs, introducing Dr. Franz Alt, National Bureau of Standards, at the ACM Conference.

THE OPENING REMARKS of the 1961 National Conference of the Association for Computing Machinery came from the general chairman, Benjamin F. Handy, Jr., of Litton Systems, Woodland Hills, California. From this point on, the Conference proceeded on the note of competence set by Mr. Handy.

Not only was Ben Handy conference chairman, but he is chairman of the massive Los Angeles chapter of the ACM. A man able to carry out big responsibilities well, Ben appears to be unperturbed, even laconic in carrying out his extramural duties. Yet the job always gets done, and gets done well. No wonder Ben's face is a welcome one in any Southern California meeting of computerdom.

Tuesday afternoon, September 5, was the time for Ben's remarks. The Los Angeles Statler Hilton Hotel was the place.

After Ben's brief words, ACM President H. D. Huskey of U. Cal. Berkeley spoke, and the conference then got under way with somewhat more technical matters.

Well over 2,000 registrants signed up under the watchful eye of James D. Tupac, conference administrator and treasurer. Physical arrangements for the sessions were excellent. The rooms were big enough. The chairs and carpets were soft enough. The public address devices, slide projectors, and similar related impedimenta all seemed to function. A new high in stagecraft competence was reached for an ACM meet.

Wednesday morning saw sessions on compiler implementation (with session chairman Randall E. Porter, busy in Europe, being subbed for by alternate Dr. Walter F. Bauer who flew in from the high Sierras just in time) and learning and automata, along with an invited session featuring Dr. R. W. Hamming and Ascher Opler.

Wednesday afternoon sessions covered various biomedical topics, matrices and non-linear systems, compiler structure theory, and information retrieval.

Thursday sessions covered error analysis and applications, business system theory and research, computer control techniques, fluid dynamics, and sequencing problems. The afternoon was largely spent in halls of discussion on various topics, following a standing-room-only pair of talks by Alan J. Perlis and Edward F. Moore.

Friday sessions included mathematical programming, business programming and simulation, computer systems, approximation and sampling theory, business applications, programming techniques, programmer training, computer engineering, and unusual applications.

Sessions, with the exception of the late Friday hours, were well-attended and well-presented. The Friday late sessions seemed to conflict with outbound airplane schedules and rump-session cocktail hours.

Phyllis Huggins, in charge of conference publicity, scheduled a number of press conferences on topics related to those of conference sessions. It was at one of these that a most remarkable and entertaining presentation was given, impromptu, and, unfortunately, attended by few.

Robert S. Barton, consultant of Altadena, California, speaking at the press session on Unusual Applications, chose the occasion to lambaste the evidence he read as indicating a bad dose of overlethargy and creeping fatheadism in the computer field.

Barton has the advantage of being a most charming presenter of his ideas, and expressing himself well and clearly. He described user groups, for example, as ". . . a way of life for the professional committee type." The manufacturers he dismissed with, "The competitive picture in the computing industry is indicative of its state of illness." The designers were put in their place with, "No one has had an original idea since Charles Babbage." Sum-

ming up the state and progress in unusual applications of computers, Barton noted, "there are no unusual applications, only bizarre and absurd ones!" While the publicity committee reached for the aspirin and hari kari knives, Barton went calmly back to work.

In other press conferences, Fred J. Gruenberger of RAND and Dr. Hamming of Bell Labs covered education in the computer field, while Edward Feigenbaum, Ascher Opler, and Willis Ware spoke on the state of the art, artificial intelligence, and computer languages.

Dr. Robert W. Rector and Werner L. Frank did an outstanding job of organizing the program. Every possible step was taken to insure a smoothly-running set of technical sessions, and these steps were apparently all in the right direction.

It was only, possibly, in the exhibit area that this year's ACM Conference was not quite up to snuff. The exhibits were rather tightly displayed in two separate areas. The encyclopedia salesmen, none of whom could spell, much less pronounce computer, seemed to have the choice space.

Perhaps it was only by contrast with the overwhelming opulence of the exhibits at the recent Los Angeles WJCC that the ACM exhibits failed to shine. One thing is certain. This Conference was the equal of any ACM attempt to date. ■

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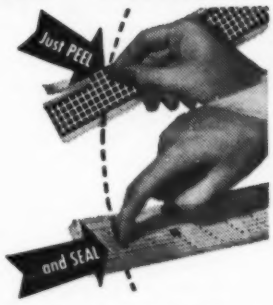

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PEOPLE AND PLACES

ADAMS ASSOCIATES appointed *Dr. Murray E. Sherry* to their Bedford, Mass. consulting staff and named *Milton L. Freeman* director of the new offiice at Anaheim, Calif.

AMPEX COMPUTER PRODUCTS Company's new manager for products department is *Donald P. Allen;* manager of product management is *Georg M. Herzfeld,* and sales engineer is *William Collins.*

AUERBACH ELECTRONICS Corporation named *Albert W. Chapple* to the product and market planning staff, and *Lawrence M. Nachberg* as senior member of that staff. Added to the technical staff are *Mrs. Suzanne L. Wolfson* and *Arthur G. Lawson.*

AUTOMATIC ELECTRIC Company appointed *Dr. Martin E. Dempsey* and *John E. Fulenwider* to new positions with the research department.

BENDIX COMPUTER division has a number of new appointments: *Robert P. Fopeano,* western regional manager; *Cary W. Armstrong,* eastern regional manager; *George Karron,* New York district manager; *George C. Peterson,* Washington, D. C. district manager. *Anthony G. Baragona* was appointed advertising and public relations manager for Bendix Computer division in Los Angeles. *Louis B. Young* is now general manager of Bendix Systems, replacing *Roy J. Sandstrom* who has been promoted to the Bendix Mishawaka, Ind. division.

C-E-I-R named *Dr. Ernest Koenigsberg* as director of operations research for the San Francisco data processing center.

COLLINS RADIO announced *J. R. Payne* as commercial products sales manager for the Communication and Data Systems division.

CONTROL DATA Corporation's Computer division announced the appointment of *Kenneth H. Olson* as product manager for the 1604 computer.

CUMMINS-CHICAGO appointed *Walter L. Mitchell* as method engineer, Southern California, and *Charles A. Carreno,* method engineer for New York City.

ELECTRONIC ASSOCIATES named *Fred L. Martinson* as vice president of their new engineering and manufacturing division.

GEVAERT COMPANY of America, Inc. appointed *Claude Maillard* as manager of industrial sales department, and *Ralph Bennet* as manager of the Denver district office.

HONEYWELL EDP division named *George W. Schnabel* as Boston branch sales manager.

IBM's changes include: *Thomas E. Buckley,* executive assistant to the chairman of the board; *William E. Andrus, Jr.,* group director of standards; *Robert W. Bemer,* new director of programming standards; *Robert W. Hubner,* director of marketing services; *Samuel B. Korin,* manager, manufacturing equipment development; and *Charles W. Mitchell,* eastern region manager of customer engineering.

ITT elected *George A. Banino* as vice president and general manager of the communications systems department.

A. KIMBALL Company, division of Litton, appointed *Robert J. Crismond* as mid-western division manager, and *Philip S. Brail* as special representative.

FRANK M. KNOX CO., management consulting firm, has named *Charles J. Berg, Jr.* to its staff.

LFE ELECTRONICS has a new product planning manager in *Fred W. Hannula.*

LITTON announced a number of changes: *Roy L. Ash* has been elected president of the company; *John J. Connolly* was promoted to vice president and general manager of data systems. *Albert G. Clark* was appointed director of applied communication systems.

MS&A, computer consultants, announced the appointment of *Edward H. Lillibridge* to its staff.

NATIONAL COMPUTER ANALYSTS of New York, Inc. is a new consulting firm. President is *Michael Miskulin;* vice president-secretary is *Albert Chiappinelli, Jr.;* and vice president-treasurer is *David O. Strickland.*

PHILCO'S changes include: *Wilbur W. Bailey* as director of plans, marketing, Government & Industrial Group; *John Dymecki* as senior sales engineer for computer division; *John A. Mellor* as administrative assistant, programming research and development; *Marvin A. Darmstadter* as manager of publications for the customer services department; and *Carl C. Mauch, Jr.,* as quality assurance project engineer for the Philco 2400.

RAYTHEON announces *J. Deryl Case* as district manager of Chicago office, and *William A. Plafcan* and *E. Ray Moore* as sales engineers for industrial components division.

RCA new appointments include *John E. Johnson,* staff vice president; *J. J. O'Donnell,* manager, commercial systems department of EDP division; *Matthew H. Cattanea,* manager, inter-divisional sales; and *Robert J. Segal,* manager, design engineering.

SYSTEMS & PROCEDURES Association named *Daniel C. Gillespie,* of Columbia Gas System Service Corporation, as "Systems Man of the Year — 1961."

STANDARD REGISTER Company named *William A. Rankin* their Cleveland district sales manager.

THOMPSON RAMO WOOLDRIDGE'S new regional office in New York City has *James J. Childs* as eastern regional manager.

WILSON JONES Company's new works manager of the main Chicago plant is *Robert F. Lindgren.*

ADAPSO (Association of Data Processing Service Organizations) elected new officers for 1961-62: *Romauld Slimak,* president; *Z. V. Zakarian,* vice president; *C. G. Green,* treasurer; and *W. H. Evans,* executive vice president. Directors

elected are *Nat Colker, H. W. Robinson, J. W. McDonald, L. J. Cooke, G. M. Witherspoon, H. J. Leedham,* and *William Levy.*

ALLEN HOLLANDER COMPANY has appointed *W. Ralph Rockhold* as director of data processing sales.

AUERBACH ELECTRONICS CORPORATION appointed *John Strella* to the technical staff. *Miss Sally Ann Dolly,* their head librarian, received the Special Libraries Council Award.

BENDIX announces the retirement of *W. A. Mara,* head of Bendix public relations and advertising; succeeding him is *Eldon E. Fox. Charles E. Rowett* is new director of sales and service for the Eclipse-Pioneer division of Bendix. *J. F. Clayton* is the staff engineer, weapon systems.

BURROUGHS CORPORATION has *Keith Bennet* as their new chief industrial engineer.

CONTROL DATA CORPORATION named *R. C. Gunderson* to the new position of manager of computation services. *Dr. Richard A. Zemlin* is in the new post of manager of applications development at CDC's computer division.

CUMMINS-CHICAGO appointed *Benjamin W. Klingelhofer* method engineer for the San Francisco-Pacific Northwest area. New manager of the Portland branch is *Richard O. Criswell.*

ELECTRONIC ASSOCIATES, INC. elected a new member to its board, *Dr. Everar Mott Williams,* professor and head of the department of electrical engineering, Carnegie Institute of Technology.

FOWLER AND ASSOCIATES announce the appointment of *Jack Lingel* and *Phillip Antonucci, Jr.* as their representatives in the Cleveland area.

GENERAL DYNAMIC/ELECTRONICS fellowship at Syracuse University has been awarded *Garth H. Foster.*

UNIVAC division of Sperry Rand appointments: *James L. Morley,* manager of financial and retail market planning; *Clifford G. Zimmer, Jr.,* branch manager, Cleveland; *Peter D. Wick,* branch manager, Omaha; *Robert A. Wolf,* branch manager, St. Louis; and *Allan H. Bibby,* branch manager, Jacksonville, Florida.

WATTS BUSINESS FORMS appointed *Howard J. Martin* director of marketing and *Paul A. Lindner* advertising and sales promotion manager.

NATIONAL FIRE PROTECTION ASSOCIATION is offering tentative recommendations for controlling fire problems in the installation and operation of electronic computer systems. The tentative standard covers fire protection features in buildings and rooms housing computer systems, and recommended procedures for safeguarding both the equipment and records. Copies of the tentative standard, NFPA No. 75-T, are 50 cents each from NFPA, 80 Batterymarch St., Boston 10, Mass.

■ ■ ■

A machine that labels up to 16,000 printed pieces per hour?

... and handles a wide range of sizes and thicknesses too? Yes, the Cheshire Model E! This remarkable machine automatically applies labels to all types of printed pieces at cost-cutting high speeds. Requires only simple adjustments to handle smaller postcards and envelopes . . . middle-sized pamphlets and brochures . . . or larger magazines, catalogs and quarter-fold tabloids. Applies wide-strip, narrow-strip, continuous pack form, cut or individual labels. Easy to operate, too!

The Cheshire Model E.

CHESHIRE INCORPORATED

Write for descriptive brochure.

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Circle no. 21 on reader service card.

NEW EQUIPMENT

RAMAC 305,II

IBM has announced a low cost version of its random access data processing system, the RAMAC 305,II. This is designed to meet the needs of smaller volumes of data processing, and will handle a typical job about 70 percent as fast as the previous RAMAC.

Monthly rental is $1,000 less than the first system—$1,850 as compared to $2,850.

Basically this system consists of a 305 processor, 340 power supply, 323 card punch, 380 console and 350 disk file.

The card punch, card reader and processor are slower than the original model; other features are the same.

The II system reads up to 80, and punches up to 50 cards per minute; storage is five million alphanumeric characters, and processing is in 50 milliseconds.

Delivery is on an eight month schedule, with first deliveries due in March, 1962.

Circle no. 31 on reader service card.

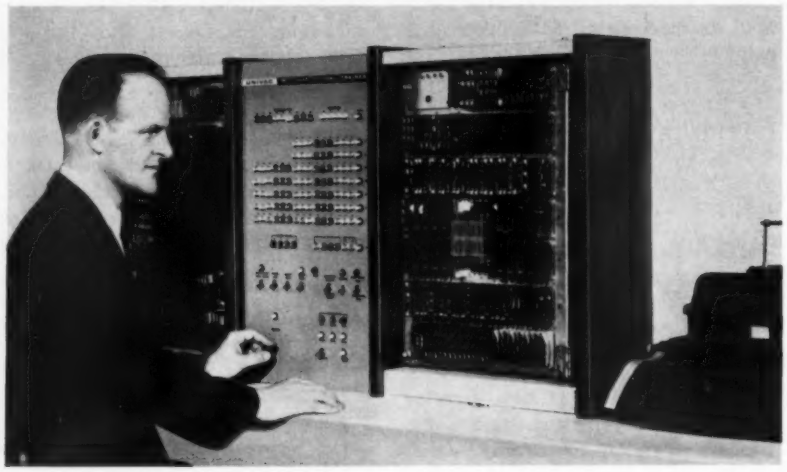
DASHEW COMPACT P.C. READER

Dashew is producing 200 units of its Datatran reader in anticipation of the demand for this all-purpose automatic punched card reader. It is small enough to be packaged within computers, with office accounting machines, solenoid calculators and adding machines, and specially wired typewriters. Or the reader can be included in systems for data collection and data transmission to read punched cards at 50 cards per minute.

The first of the ordered machines will be delivered about November. The unit was developed by Electronic Datacouplers, Inc., a Dashew subsidiary.

Circle no. 32 on reader service card.

UNIVAC TRAINER



The Univac Military Digital Trainer, a desk size binary computer with many large scale computer characteristics, has been introduced by the Univac Military Department, St. Paul. The applications range from training in computer maintenance, design and programming to the solution of many data processing problems.

The portable unit takes eight cubic feet of space, rates from 60 cycle, 110V AC power. It is priced at $35,500.

The trainer has a high speed magnetic core memory with 512 words of 15 bits of random access storage with a read/restore cycle of eight microseconds, add time of 24 microseconds, and multiply/divide time of 130 microseconds.

There is a complete console with all arithmetic and control registers for operator intervention and for teaching operator procedures.

Input/output is by automatic typewriter with paper tape reader and punch as included equipment.

The computer, designed to meet the requirements of both military training and data processing centers, will become available before the end of this year. Delivery is guaranteed within six months of order.

For educational and training use, the machine permits demonstration of all elements of large computers. Trainees receive total computer training on a complete set of equipment.

As a data processing device, the trainer can be used for instructing new personnel without interrupting the use of full scale data processing equipment. Sufficient memory capacity and data processing capability allow its use outside of the classroom.

Other peripheral equipment can be added to increase the capability of the trainer and adapt it to scientific applications.

Circle no. 33 on reader service card.

NCR 450 PROOF MACHINE

National Cash Register is offering the NCR 450 proof machine, the first to use a replaceable type program board, for check handling. The program board controls the use of distribution totals, magnetic ink imprinting, computation of "float," and endorsement of checks. The machine also offers up to 40 totals of automatic sort, the greatest number available in a proof machine.

The machine enables a bank to combine several separate operations into one: sorting, listing, imprinting amounts in magnetic ink, and endorsement of checks are all done as an automatic by-product of verifying the accuracy of deposits.

The proof machine consists of a central operating console, a sorter-endorser unit, and an individual listing tape printer for each corresponding classification total and document storage department.

Three models are available: 24, 32, or 40 pockets with a corresponding number of distribution totals and listing tape printers. An automatic total feature permits all machine totals to be automatically cleared and printed on a master tape and individual listing tapes.

First deliveries will be made early in 1963. Prices start at $12,995; rentals begin at $260.

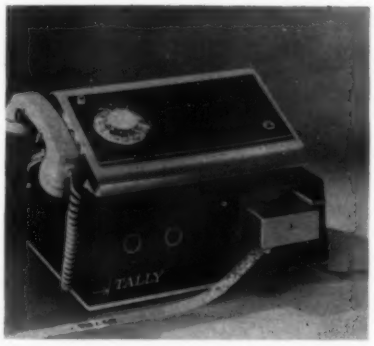
Circle no. 34 on reader service card.

TALLY DATA COMMUNICATIONS SYSTEM

Tally Register Corporation offers a new low cost parallel data communication system for fast transmission of data over dial telephone networks. The Tally Data Communications Equipment was developed for use with Bell's Data-Phone; it provides one way or bi-directional transmission of perforated tape data at speeds to 60 characters a second or 600 words a minute. Tape format or code structure are unrestricted.

There are three versions of the DCE. Mark 1 system consists of simple transmission and reception. Mark 2 and 3 systems are combinations of transmit and receive systems with error correction and additional editing features.

▲ **Circle no. 35 on reader service card.**



IBM 188 COLLATOR

The first punched card collator with a core memory and solid state concepts was announced by International Business Machines Corporation in October.

In the 188 collator core storage takes the place of relays and transistors replace vacuum tubes, mak-

(continued on next page)

Do you see

IMAGE ASSOCIATION, based on each individual's background and emotional development, is called a PERSONAL SCIENCE because each person tested gives his own interpretations to the pictures he sees.

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TWO FIGURES?
EAGLES?

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PRESS-ON (self-sticking) PIN FEED LABELS · GUMMED LABELS · PAPER FORMS · CARDS

Circle no. 22 on reader service card.

ing the memory function electronic rather than electro-mechanical.

Control panel wiring is reduced by an estimated 50 percent with a simplified wiring panel for functional and positional control.

Card capacity of the main feed is 3,600 cards, with a secondary feed hopper capacity of 1,200 cards. Cards enter from each feed at the rate of 650 per minute; using both feeds up to 1,300 cards per minute can be processed.

Basic functions of the 188 include merging, matching, primary and secondary sequence checking, merging with selection, card selection and editing.

Three modes of sequence on the standard model are alphameric, numeric and blank equal zero, and numeric with blank detected as an error. These modes can be controlled by control panel wiring on a column-by-column basis.

Three control position capacities available are 16, 22, and 28 card columns.

Deliveries will begin in 10 to 12 months. Rental is $575 a month for the model with 16 control positions which sells for $30,750. The full 28 control position unit rents for $625, sells for $31,250.

Circle no. 36 on reader service card.

DATA-PHONE 402

Bell Telephone System's Data-Phone 402 will permit parallel transmission of punched tape over voice lines. The 402A is the data sending set and the 402B, the receiving set, designed for use with parallel data systems. These work at speeds up to 75 characters a second.

The first use of the 402 will be with the Tally punched tape transmission equipment.

Circle no. 37 on reader service card.

402A — Data Sending Set

402B — Data Receiving Set ■

DATA PROCESSING CONSULTANT

National firm of certified public accountants offers an exceptional opportunity to do professional problem-solving work in the areas of data processing and management information systems.

Position involves responsibility for assignments in systems design, feasibility studies, equipment evaluation, installation planning, conversion programs, and post-installation audits and reviews.

Qualifications and background desired:

Capacity to deal effectively with business executives and organize the work of others.

Ability to motivate management to act on recommendations. We are not seeking the "hardware specialist."

Experience with both tabulating equipment and electronic computers.

College degree plus general business management experience or MBA.

Age: 28-35.

Starting salary to $15,000. Great opportunity for growth in compensation and professional stature. Location preferences will be considered as firm has offices in many principal cities.

All replies will be held in complete confidence. Please submit complete resume including experience, education, age, and salary history to:

Box 1101,
DATA PROCESSING MAGAZINE
22nd Floor Book Tower
Detroit 26, Michigan

NOTABLE QUOTES

"Recently, a business publication asked that I speculate about the Office of the Future. I painted a word picture of an airy, circular shaped office, focused around a data transmitting console. A few trim, pleasant looking operators punched out information in a common business language. By wire, it sped to astro-speed computers in a central data processing facility where the data was digested, analyzed, scrutinized, and pulverized, and back came the printed word and the televised image.

"Eagerly awaiting this distillation of information were the radiant executive team of the future. Freed from the shackles of paper work, unfettered for their most important job of executive decision-making, the knowledge they needed flashed on a screen before them and was delivered via teletypewriters in written form. Decisions were made crisply, ideas sprouted from the well-plowed field of facts and the Golden Eagle of prosperity flew over the land.

"In outline that was the picture I painted by day. But that night, my predictions produced a nightmare. There was a sales executive being crushed under four tons of sales analyses, there was the production engineer being strangled by punched tape, and there was the president of the company, his office, from floor to ceiling, piled high with reports, figures, and indices, computations, and permutations. His exit plugged, his office stuffed, and he, emaciated and bug-eyed, reading his way through the reports at a rate slower than the reports were being produced. Data, data everywhere and not a drop to drink.

Owen Smith, at the 1961 Annual Seminar of the National Association of Accountants, St. Louis Chapter."

PRODUCTS SERVICES

REMOTE TAPE SWITCHING

Up to eight magnetic tape units (IBM 729 II or IV) may be switched from the control of one machine to the control of another by pushing a button on IBM's new 7155 switch control console. The 7155 may be located anywhere up to 50 feet from the tape units.

In a 7000 series/1401 operation, an output tape may be written from a 729 tape unit connected to the larger computer; the 729 may then be switched to control by the 1401 for off-line printing without any manual handling of the tape. Switching by the 7155 may be from one computer to another; between two tape channels on the same computer; or between a computer and an auxiliary tape input/output system. Average monthly rental of the 7155 is $395; average purchase price is $20,275. The unit is available now and may be factory or field installed on any solid state IBM system using 729 tape drives.

Circle no. 40 on reader service card.

NEW TYPE FILE CABINET

Wheeldex & Simpla Products have a new side-opening file unit called Shelvadrawer. It is a cross between file drawer and shelf filing which allows two clerks to have working access to the same unit. Shelvadrawer is available in units three, five, or seven levels high.

Circle no. 41 on reader service card.

P AND G GAME

Proctor and Gamble has used a new business game, MATRIX (Management Trial Exercise), developed by P and G in collaboration with Dean Lowell Herron (Clarkson College of Technology), as part of its summer training program for college students at 13 of its plants. This is the first time such a game has been used in a company's summer training program; the first use of a large number of non-repetitive, interacting judgment problems in a business game; and the first such simulation centered on a position (plant manager), rather than a broad function. P and G hopes the exercise will be helpful by letting technical students know firsthand how the various phases of a plant operation are related, and what it is like to carry the full responsibilities of a plant manager.

Circle no. 42 on reader service card.

OFFICE CONVEYOR

A new patent has been assigned to Mercury Industries for its office conveyor. The unit moves individual forms and documents on traveling belts to various desk positions along the route of movement.

Circle no. 43 on reader service card.

RUSSIAN TRANSLATION

Using an unspecified computer and a program called UTS (Unified Transfer System), Machine Translation, Inc. has translated Russian language text into English at a rate of 60,000 words an hour. Using UTS and an IBM 7090, the company plans to begin translating at 150,000 words an hour a year from now. In theory, a UTS-programmed IBM STRETCH computer could translate from Russian to English at one million words an hour.

Circle no. 44 on reader service card.

BOISE SERVICE CENTER

Multnomah Data Processing Center of Portland has opened a branch service office in Boise, staffed by one resident employee and equipped initially with a modest battery of IBM punched card equipment. The service center will process inventory control problems, sales analyses, payrolls, banking transactions, market research surveys, and cost control data. Problems requiring solutions or programming from MDPC's IBM 1620 computer will be relayed to the Portland headquarters office for processing, and the results will be re-transmitted to Boise.

Circle no. 45 on reader service card.

BASICPAC

A lightweight, mobile computer designed for use in forward combat areas has been delivered for acceptance tests to the U. S. Army by Philco Corporation.

The computer, known as "Basicpac," is installed in a box-like all-weather shelter which can be mounted on a 2½-ton truck for transport to new operating locations.

Basicpac features rugged construction and reliable components to minimize the effects of temperature, humidity, noise, vibration, shock and dust, under severe field conditions.

Basicpac will handle a variety of combat computations as part of such field operations as logistics, administration, intelligence, command control and fire support. It can calculate weapon target allocations, loading plans and march tables, estimates of weather and nuclear fallout patterns, and reallocation of radio frequencies in the event of enemy jamming.

Circle no. 46 on reader service card.

NEW PUNCHED CARD PLANT

Detroit, Michigan is the site of a third punched card manufacturing operation of J. J. Hackett and Company. The Detroit facility has a production capacity of 60 million cards a month, and can manufacture special orders such as perforated, prepunched and consecutively numbered cards.

Circle no. 47 on reader service card.

GPL MICROFILM TELEVISOR

A microfilm readout device which can operate in a remote location up to several miles from the microfilm file is offered by GPL Division of General Precision, Inc. Closed circuit television links the monitor display to the central file. The viewer calls the central filing station by intercom or telephone with his request; a file operator places a microfilm aperture card in the Microfilm Televisor. At the remote location, the viewer may position or magnify the document on the monitor screen.

Circle no. 48 on reader service card.

CENSUS DATA

For the cost of reproduction, the Census Bureau is supplying summary population and housing figures for small geographic areas. These data are available in reproduced statistical tables, microfilm, and magnetic tapes compatible with Univac 1105 computers.

Circle no. 49 on reader service card.

P76 TAPE PUNCH

The Model P76 tape punch, for punching 5, 6, 7, and 8-channel paper or Mylar-aluminum tape at the rate of 20 characters per second, has been announced by Systematics, a division of General Instrument Corporation.

The new tape punch features a power-operated back space for error correction; an enclosed, jam-proof chad disposal box which eliminates chad "pile-up and back-up" which can result in punch damage; and completely enclosed tape supply (1,000 feet) and take-up (400 feet) reels.

All lighted controls and indicators for the tape punch are located in one central panel on the front of the punch. Standard equipment includes lighted pushbuttons for power on; low tape supply and tight tape and broken tape (same lighted pushbutton); and a tape feed pushbutton which is located inside the cover enclosure. When the tape punch is used as part of a system, the P76 includes the above indicators plus lighted pushbuttons for parity check indication and a run halt control, both located in the external control panel, and a single-cycle punch pushbutton located inside the cover enclosure.

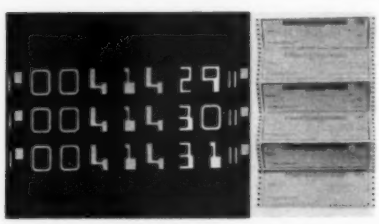
The complete tape punch measures 15 inches in width and 14½ inches in depth; the height with cover open is 21 inches. Total weight of the complete punch is 40 pounds. Delivery is 30 days from date of receipt of order.

Circle no. 50 on reader service card.

LABELING HEAD

Cheshire, Inc., has a new labeling head which can be supplied with that company's labeling machines. The new device handles three, four, and five label-wide, continuous label forms, first cutting strips of labels across the width of the form, then separating these into individual labels and applying them at up to 18,000 labels per hour.

Circle no. 51 on reader service card.



MICR CONSECUTIVE NUMBERING

American Bank Note Company is producing continuous form MICR checks that are consecutively numbered. The use of MICR consecutive numbering is designed to aid in check reconciliation.

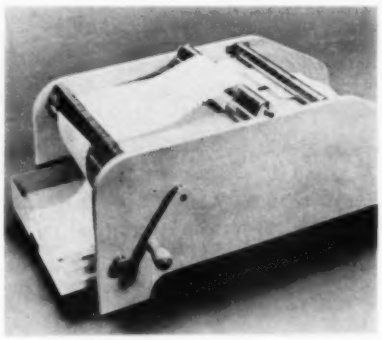
Circle no. 52 on reader service card.

ELECTROFILE

Acme Visible Records, Inc. has an automatic filing unit called Electrofile. The unit is similar to edge-punched, needle-sort filing systems except that both coding and searching are done through the unit's keyboard. A series of small metal teeth form the bottom edge of a file card used in the Electrofile system. An uncoded card would have a complete

row of teeth; coding causes a pattern of teeth to be removed. More than one classification code may be assigned to a card. The cards may be removed from the file for use elsewhere, and are replaced anywhere in the file unit. To find a card — since the cards are maintained in random order—the operator keys the code number, causing the selected card to be raised slightly from the rest of the file.

Circle no. 53 on reader service card.



AUTOMATIC BURSTER

Tech Panel has a small continuous forms burster that weighs 45 pounds, measures 31¾ x 18 inches, and will burst forms 3 to 11 inches long and up to 15 inches in width. Called the Davis Automatic Burster, it has no knives, slitters, or hammers, and is adjustable through a single knob. The price is $225 F.O.B. Baltimore, including manufacturer's excise tax but excluding any local tax or foreign import duty.

Circle no. 54 on reader service card.

1402 INPUT IMPROVED

An early card read feature can be added to IBM's 1402 which should bring the effective card input speed closer to the rated speed of 800 cards per minute in some programs. In order to achieve 800 cpm, no more than 10 ms of computer time may be used between read operations. If more than 10 ms are used, the standard 1402 will skip one cycle and cut the card reading rate to 400 cpm. With the early read feature, however, the 1402 read cycle (75 ms) is cut into three 25 ms segments. A new card may be read at the end of a 25 ms period, rather than requiring a full cycle to go by. The result in some cases should be a 50 per cent speed increase — from 400 to about 600 cpm. The 1402 early card read feature rents for $10 monthly, sells for $215, and can be field installed starting in December, 1961. Factory installation is scheduled to begin in March, 1962.

Circle no. 55 on reader service card.

CLOSED CIRCUIT TV

A closed circuit television system, designed by Dage Division of Thompson Ramo Wooldridge, facilitates communication of signature cards, ledger records, account balances, and payment records, from any of three cameras to key departmental locations in a bank.

Circle no. 56 on reader service card.

■ ■ ■

One always stands out!

VPC Panels are UNCONDITIONALLY GUARANTEED because of exacting quality-control from inspection of raw materials; checking after each machining operation; to final inspection before shipment.

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Circle no. 23 on reader service card.

OFF LINE

COMPUTER PREDICTION

The recent Bendix G-15 Users Exchange Conference, meeting in Denver, heard Dr. Richard Hamming of the Bell Telephone Laboratories predict that the "Computer revolution will have a great effect on future generations and that it will require a gradual reorganization of man's conception of himself and his relation to the rest of the universe.

"Most news stories about computers stress the physical side . . . but it seems to me that it is the intellectual aspects of this revolution which are more important and far more interesting than the physical background against which they occur.

"These intellectual activities by computers will have profound effects on science, economics, politics, and philosophy, producing changes in everyone's life."

HOSPITAL DATA

The Commission on Professional and Hospital Activity will analyze records of 2.5 million patients discharged from hospitals in 1962. Early in 1962 a Honeywell 400 computer system will be installed for full time use in the Ann Arbor (Michigan) headquarters.

A vast array of diagnostic and hospital care data covering many patients discharged from member hospitals in 32 states, Puerto Rico, and Canada, will be analyzed. This program is to help hospitals raise their standards.

Presently, working on a Datamatic 1000 in Detroit, PAS analyzes case records of about eight percent of dischargees from U. S. General Hospitals; with the 400 on-premise the rate is expected to go to 15 percent next year — and in future years up to 50 percent.

This work helps hospitals, individual physicians, and hospital-medical insurance plans.

HIGH SCHOOL STUDENTS LEARN PROGRAMMING

Twelve high school students, chosen from a group which had learned to program an IBM 709 last spring, learned to program an IBM 1620 in four weeks of two hour sessions. This experimental class, as well as the previous one, is sponsored by the Washington, D. C. chapter of ACM with the cooperation of the University of Maryland.

This educational course is designed to attract talented youngsters to the computing field and to the computer programming profession. ACM foresees a need for some 200,000 new programmers in the next decade to meet the demands of business, industry, government and research. ■

Officers of the Northwest Chapter of the National Machine Accountants Association and the Governor of Minnesota proclaim "MINNESOTA ELECTRONIC DATA PROCESSORS' DAY."

Standing left to right are: Warren R. West, director at large; Robert H. Hain, vice president; H. C. Crosby, president; Thomas Dorsey, secretary; Richard Frost, director at large; Clarence Holtz, vice president. Seated is Elmer L. Anderson, Governor of Minnesota.

Signing of contracts covering the largest commercial sale of data processing equipment ever made, and a patent licensing and technical information agreement, took place October 2, 1961, between the Radio Corporation of America and Compagnie des Machines Bull of Paris, France, in the RCA board room in New York.

Shown here examining a memory core unit, which signaled the age of high speed computers, are: (left to right) Mr. Herve Alphand, French ambassador to the United States; George Vieillard, directeur general, and Joseph Callies, president and directeur general, of Machines Bull; and Brig. Gen. David Sarnoff, chairman of the RCA board, and John L. Burns, RCA president.

FIRST OF NEW NCR COMPUTERS GETS FINAL CHECK

Robert S. Oelman, president of The National Cash Register Company, looks on as Miss Mary Rath checks out the first production model of the company's desk-size computer, the Class 390, at NCR's Dayton factory.

NCR will deliver approximately 50 of the 390 systems yet this year to manufacturing companies, government agencies, accountants, banks, savings and loan firms, mortgage companies and other types of businesses.

DATA . . . yours for the asking

GLUE-FAST EQUIPMENT Company has a new glue product for adhering punched cards to cartons, cases, etc. The GF#55 liquid glue, described in a new bulletin, makes it possible to use cards as address shipping labels, product identification, inventory control data labels, and similar uses.

Circle no. 70 on reader service card.

PORT HURON SULPHITE & PAPER Company has a folder explaining the use, with samples, of OPTI-SCAN carbon paper for use with optical scanning equipment. This carbon paper was developed especially for optical scanning equipment and must not smudge.

Circle no. 71 on reader service card.

DATEX CORPORATION has a new bulletin, "Gas Flow Recording and Interruptible Monitoring System."

Circle no. 72 on reader service card.

UARCO's new brochure, *Administrative Workload Require a Diagnostic Check?* treats of the general problems faced by hospital administrators in simplifying and standardizing paperwork problems, and shows how a hospital should use a "dollar value" approach to its accounting.

Circle no. 73 on reader service card.

UARCO's second brochure offering is called *Automated Data Processing Solves Hospital's Patient Billing Problems.* It is a case study of Wesley Memorial Hospital, Chicago, where forms helped achieve a more efficient, simplified business system.

Circle no. 74 on reader service card.

RAYTHEON'S four page brochure describes the DataRay 401 data transmission system for data transmission over telephone lines.

Circle no. 75 on reader service card.

PRO-FORMS has a new four page brochure describing their method of data processing procedures writing. There is a detailed explanation of how standardized Pro-Forms procedures kits may be applied to all sizes of data processing installations.

Circle no. 76 on reader service card.

BENDIX'S Computer Division has a six page brochure illustrating the hardware, software, and service features of the G-20 computing system. This details the over all system with illustrations of each component; it also describes the customer support program, including the G-20 Users Group, program library, space programming, and on-site maintenance teams.

Circle no. 77 on reader service card.

OMNITRONICS, INC., is offering a bulletin which gives complete specifications on the Model RS-400 Reeler for paper tape speeds up to 60 ips, with reels up to 10½ inches in diameter. This modular unit is compatible with any high speed paper tape system.

Circle no. 78 on reader service card.

MINNESOTA MINING & MANUFACTURING Company's eight page illustrated brochure, *Cutting Engineering Data Cost with Microfilm,* describes savings made by this system at Collins Radio Company. Included is a description of electronic telephone communications which automatically activate a quick access file of Filmsort aperture cards; duplication of aperture cards; microfilm mounting; and printout of data.

Circle no. 79 on reader service card.

PHILCO'S *Matrix Operations of the Philco 2000* cites some of the features of the system which make for speed of operation.

Circle no. 80 on reader service card. ■

DATA PROCESSING INSURANCE

This new protection—The St. Paul Data Processing Policy—protects your company as no other single policy or plan does. It is, in fact, the one and *only* policy that can and *does* give you the protection you need with these three optional coverages: (1) Pays for extra expenses resulting from destruction or damage to any part of your data processing system whether caused by fire, flood, wind, collapse, theft, water damage or any of many other unusual perils. (2) Pays for costs of reassembly and reproduction of damaged or destroyed records and/or tapes. (3) Pays for repair and/or replacement of damaged or destroyed data processing equipment.

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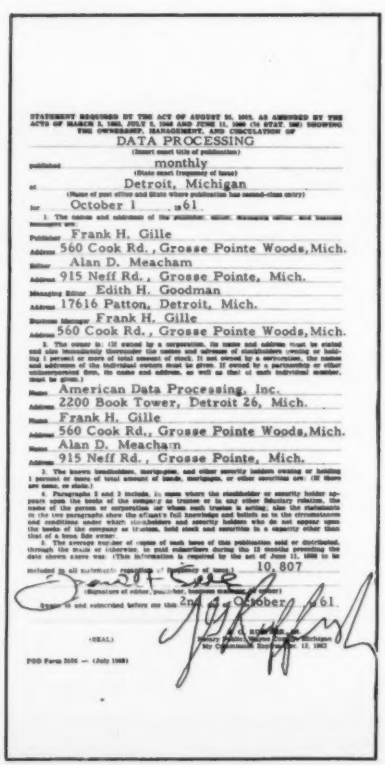
BOOK SHELF

ELECTRONIC DATA PROCESSING AND AUDITING by Felix Kaufman. The Ronald Press Company, 15 East 26th St., New York 10, N. Y. 1961. 180 pages. $6.00.

Many persons responsible for the auditing of computer-processed information have been concerned about how this can best be accomplished. The combination of invisible records, new patterns of data organization, and the complexities of computer programming and operation have made it difficult for these persons to understand and resolve the differences between traditional auditing concepts and those engendered by the use of electronic computers. Dr. Kaufman, a C. P. A. and partner of Lybrand, Ross Brothers and Montgomery, has drawn on his extensive experience with both the auditing function and electronic data processing systems design and management to bridge the gap between these two disciplines with a well-illustrated and definitive treatment.

Without wasting the reader's time with more technical data than is required for the purpose of the book, the author explains the nature of computer processing and the planning steps involved; describes audit methods for a number of important computer-run applications; and then pinpoints some especially useful techniques currently being employed to audit various kinds of computer runs. Traditional audit procedures are examined one by one in context with electronic data processing, and the reasons for procedural changes, where necessary, are explained. The book has an index and contains many clearly understandable diagrams and flow charts.



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published monthly
(State exact frequency of issue)

at Detroit, Michigan
(Name of post office and State where publication has second-class entry)

for October 1 , 19 61

1. The names and addresses of the publisher, editor, managing editor, and business manager are:

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Address 560 Cook Rd., Grosse Pointe Woods, Mich.
Editor Alan D. Meacham
Address 915 Neff Rd., Grosse Pointe, Mich.
Managing Editor Edith H. Goodman
Address 17616 Patton, Detroit, Mich.
Business Manager Frank H. Gille
Address 560 Cook Rd., Grosse Pointe Woods, Mich.

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Address 2200 Book Tower, Detroit 26, Mich.
Name Frank H. Gille
Address 560 Cook Rd., Grosse Pointe Woods, Mich.
Name Alan D. Meacham
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5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required by the act of June 11, 1960 to be included in all subsequent issues of this statement.) 10,807

(Signature of editor, publisher, business manager, or owner)

Sworn to and subscribed before me this 2nd day of October, 19 61.

(SEAL)

My commission expires

POD Form 3526 — (July 1960)

INDEX TO ADVERTISERS

American Data Machines, Inc. 45
American Data Processing, Inc. . . . . 42 and 43
Avery Label Company 27
W. H. Brady Company 55
Business Electronics Inc. 67
Capital Equipment Corporation 66
Cheshire, Inc. 57
Codo Manufacturing Corporation 50
Cummins-Chicago Corporation 22
Graphic Systems 67
International Business Machines Corporation, Data Processing Division . . . . . 47, 6 and 7
Kee Lox Manufacturing Company 55
MAC Panel Company . . . . . 21 and Inside Back Cover
Monroe Calculating Machine Company, Inc. . . . . Inside Front Cover
National Cash Register Company, The . . . . . Back Cover
Normandie Press, Inc. 59
Office Equipment Manufacturing Company, Inc. 67
Panels Wires Incorporated 29
Philco Corporation 37
Royal McBee Corporation 31
St. Paul Insurance Companies, The 41
Tab Products Co. 33
Tedlar Co., The 65
Total Insurance Planning Center 65
Univac Division, Sperry Rand Corporation . . . . . 34 and 35
Varifab, Inc. 38
Virginia Panel Corporation 63
Wright Line Division, Barry Wright Corporation . . . . . 51 and 52

MATHEMATICAL MACHINES by Francis J. Murray. Volume I, DIGITAL COMPUTERS; Volume II, ANALOG DEVICES. Columbia University Press, 2960 Broadway, New York 27, N. Y. 1961. Volume I: 300 pages. $12.50. Volume II: 365 pages. $17.50.

Illustrated with circuit drawings and mathematical formulae, these two volumes present digital and analog equipment from the standpoint of the mathematician. Volume I deals with the circuit devices which are incorporated into a number of digital machines, including manual and punched card electromechanical equipment as well as electronic computers. Volume II considers continuous computers, true analogs, and various mathematical instruments. Each volume has an index but no bibliography. Volume I includes a cursory survey of some computers. An excellent set for the mathematician. ■

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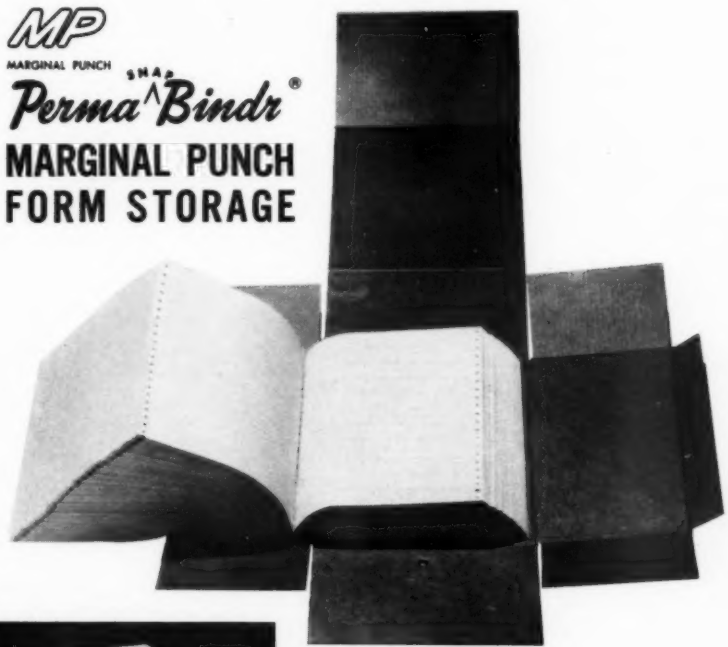

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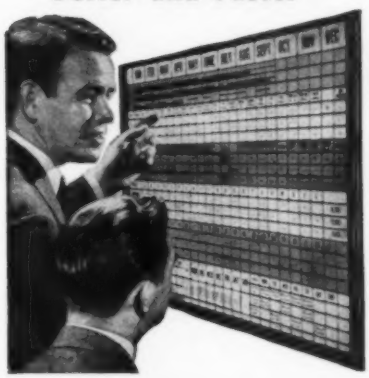

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editorial

IT IS TIME that computer users, manufacturers of data processing systems, and the clerical unions involved, decide how they can benefit from information compiled by colleges, universities, and research groups conducting studies in the field of data processing.

Several major universities have established formal research centers staffed with competent personnel experienced in all phases of information gathering. These highly qualified individuals are frequently hampered in their efforts to gather needed information about the data processing field because, to quote Dr. Blum of Michigan State University: "there exists a lack of cooperation by certain companies and certain unions in permitting us access to, and interviews with their staffs. There is a great need for more basic research — this has been expressed many times. The only way research of value to industry can be done by university personnel is through the cooperation of the people in industry."

Dr. Hardin, also of Michigan State University, found that it became "an expensive and difficult operation to collect all the data needed prior to the introduction of a computer, and that unless complete data *after* the installation is also gathered the original data has no independent value. Many times something goes wrong during the conversion phase and the company doesn't want you to observe what corrective steps are then taken."

The lack of before and after data, plus the lack of a control group, can be one of the greatest obstacles to a successful data processing study.

Yet, the data processing field is a valid area for study and research. The explosive effects — on individuals, on organizations, and on our entire economy — of data processing generated in the past decade surely deserve objective, methodical scrutiny, if for no other reason than to determine just what these effects are.

Otherwise, as Dr. E. W. Martin of Indiana University has said, "We shall be like the occupant of a speeding car, whose only view of the road is through the rear view mirror."

Accredited organizations conducting data processing studies deserve full cooperation from all concerned. ■

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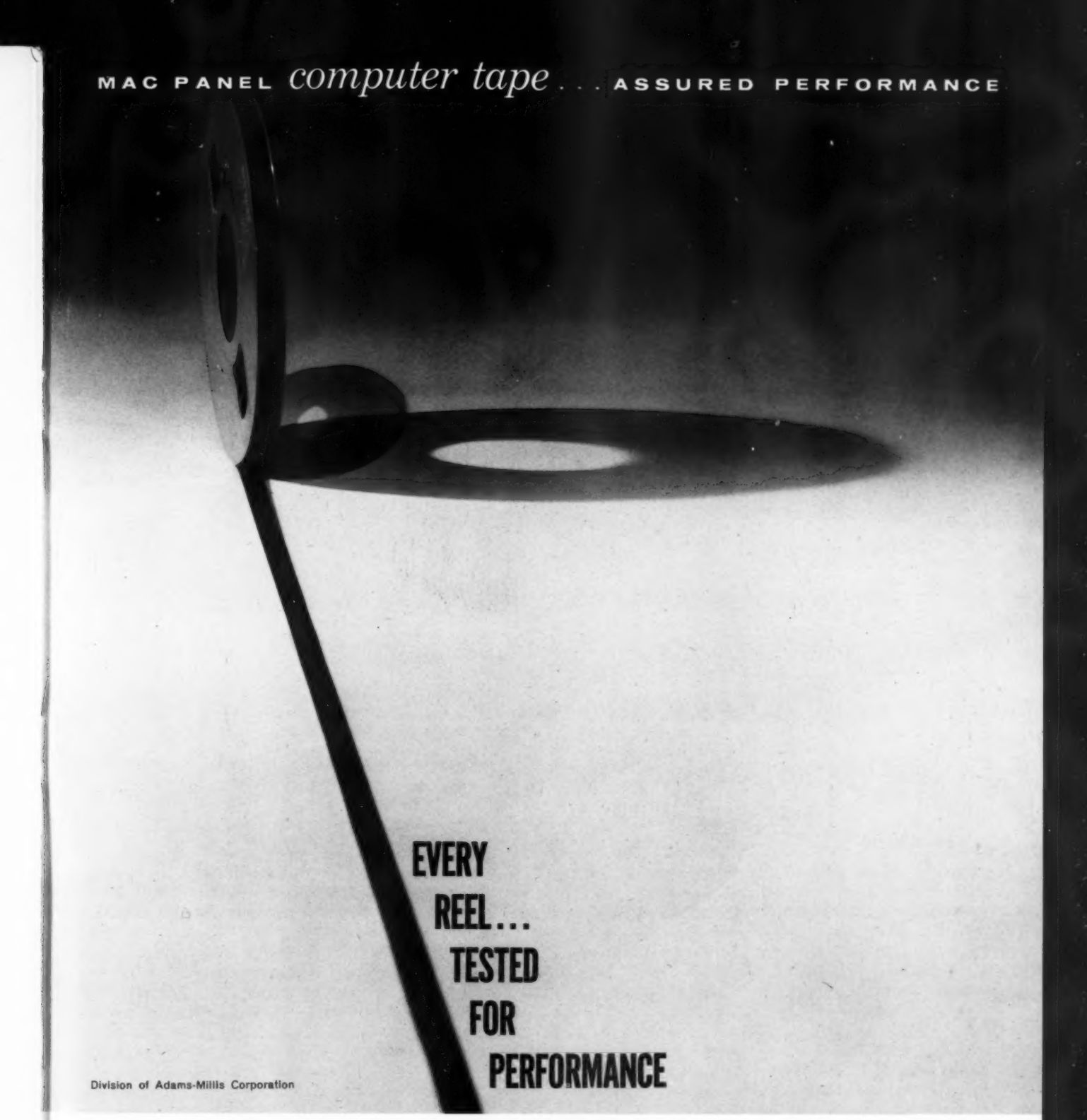

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